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# JAPANESE AIRCRAFT

## PERFORMANCE & CHARACTERISTICS

## TAIC MANUAL NO 1

陸海軍

PUBLISHED IN THE DIVISION OF NAVAL INTELLIGENCE BY THE COMBINED PERSONNEL OF UNITED STATES AND BRITISH SERVICES FOR USE OF ALLIED FORCES

TECHNICAL AIR INTELLIGENCE CENTER NAS ANACOSTIA, D.C.

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* Obsolete or obsolescent  ** Performance not available  *** Performance will be issued

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## ARMY TRANSPORTS

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|---|---|
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* Obsolete or obsolescent ** Performance not available *** Performance will be issued

# INTRODUCTION

## GENERAL

Japanese Aircraft Performance and Characteristics TAIC Manual No. 1 is now issued in the Division of Naval Intelligence by combined personnel of the United States and British Services attached to the Technical Air Intelligence Center, Naval Air Station, Anacostia, D. C. TAIC Manual No. 1 is the Official Japanese Aircraft P & C Manual for the Allied Forces and is issued to provide up-to-date Performance and Characteristics data in a standardized, convenient, and useful form.

Data sheets will be revised as more complete and accurate data becomes available. It is essential, therefore that revised sheets be entered in the Manual immediately upon receipt and that the supplement number of the revised sheets be entered in the space provided on the inside front cover.

All sheets pertaining to the same basic type of aircraft, such as the Zeke types, carry the same basic number followed by a different capital letter for each particular model, starting with "A" for the first model. The capital letter is followed by a number to indicate page number for the set of sheets covering a particular airplane. For example the data on Zeke 32 will be found on sheets 102 C–1, 102 C–2, etc., while the data on Zeke 52 will be found on sheets 102 D–1, 102 D–2, etc.

An index is provided for convenience in locating data on fighters, bombers, etc., and for locating data on engines, armament, radio, etc. The alphabetical index will assist in rapidly locating data on a given aircraft.

## PERFORMANCE CALCULATIONS

Except where otherwise stated, performance figures represent estimates of the Technical Air Intelligence Center and have been calculated after a careful analysis of information derived from intelligence, captured equipment, drawings, and photographs, using power ratings derived from the same sources. When authoritative evidence is not available, it is the policy of TAIC to give the Japanese Aircraft Performance every benefit of the doubt within reasonable limits.

Aircraft weights are estimated except where noted. In general the weights have been set up to show the maximum military effort for several representative conditions.

Range is computed in straight and level flight at 1,500 feet altitude. Bombing plane range figures include dropping of bombs at approximately mid-distance or range.

All speeds are expressed as true airspeed at the altitude concerned and are based on the airplane having a smooth finish and most favorable drag. Vmax is estimated using Military Power (Mil. H. P.) and, when available, War Emergency Power (WEP) for representative conditions.

Horsepowers are expressed in English units.

Wing areas are gross areas including fuselage areas intercepted by wings.

Rates of climb are based on Military Power for continuous climbing and War Emergency Power (when available) for short duration get-a-way climbs.

Times to altitude are based on Military Power *only*.

## RANGE—SPEED—CLIMB CURVES

These curves are furnished for convenience in determining the range, speed, and climb of a given airplane under various representative conditions.

## FIELDS OF FIRE—VULNERABILITY—FLAME PATTERNS

These data are presented so that important combat data required in planning will be available on one sheet. "Fields of Attack" or "Fire Free Fields" are included for certain aircraft to assist in visualizing best angles of approach. "Flame Patterns," where shown, are rear views.

## DRAWINGS AND PHOTOS

Graphic data are included wherever possible so as to provide a visual conception of each aircraft.

## ENGINES—ARMAMENT—RADIO

See introduction to each particular section.

## REMARKS

Reliable data which definitely indicates that any of the material presented in TAIC Manual No. 1 is inaccurate should be immediately forwarded to the Technical Air Intelligence Center, Naval Air Station, Anacostia, D. C.

NOTES

# JAPANESE CODE NAMES

The purpose of this section is to clarify the chronological development of coded Japanese aircraft and to give data on earlier models whose performance is not included in the Manual. In some cases where the latest model of a series is believed to be in limited production, full data is given on any preceding model that is fully operational. Obsolete or obsolescent aircraft are indicated as such under the heading "Comments."

Engines are listed by their operational designations where possible and by the latest abbreviated "Ha" symbols in cases where no other information is available.

| Current Allied Code Name | Former Code Name | Recognition Type | Japanese | | Assembled By | Engine | Engine Made By | Comments |
|---|---|---|---|---|---|---|---|---|
| | | | Description | Model-Type Symbols | | | | |
| **NAVY FIGHTERS** | | | | | | | | |
| CLAUDE 14 | Claude | 1E–F | Type 96 carrier-borne fighter, Model 14 | A5M4 | Mitsubishi | Kotobuki 41, 9 cyl. radial | Nakajima | Obsolete, but reported in operations recently. May have Kotobuki 42 engine. |
| ZEKE 11 | Zeke Mk 1 | 1E–F | Type 0 carrier-borne fighter, Model 11 | A6M1 | Mitsubishi | Sakae 12, 14 cyl. radial | Nakajima | Obsolete. Fixed wing tips. |
| ZEKE 21 | Zeke Mk 1 | 1E–F | Type 0 carrier-borne fighter, Model 21 | A6M2 | Mitsubishi and Nakajima | Sakae 12, 14 cyl. radial | Nakajima | Going out of service. Folding wing tips. 142 U. S. gals. fuel. |
| ZEKE 22 | Zeke Mk 2 | 1E–F | Type 0 carrier-borne fighter, Model 22 | A6M3 Modified | Mitsubishi | Sakae 21, 14 cyl. radial | Nakajima and Ishikawajima | Out of production. Folding wing tips. 156 U. S. gals. fuel. Auxiliary tanks within wings. |
| ZEKE 32 | Hamp | 1E–F | Type 0 carrier-borne fighter, Model 32 | A6M3 | Mitsubishi | Sakae 21, 14 cyl. radial | Nakajima and Ishikawajima | Out of production. Blunt wing tips. Shorter span. 137 U. S. gals. fuel. |
| ZEKE 52 | ..... | 1E–F | Type 0 carrier-borne fighter, Model 52 | A6M5 | Mitsubishi | Sakae 21, 14 cyl. radial | Nakajima | Blunt, rounded wing tips. 156 U. S. gals. fuel. Same span as ZEKE 32. |
| ZEKE 52 | ..... | 1E–F | Ditto | A6N5 | Nakajima | Sakae 31, 14 cyl. radial | Nakajima | Latest development of ZEKE series. Model designation may be temporary. |
| RUFE 11 | Rufe | 1E–FFP | Type 2 fighter seaplane, Model 11 | A6M2–N | Nakajima | Sakae 12, 14 cyl. radial | Nakajima | Obsolescent. Developed from ZEKE 21. |
| SAM 11 | ..... | 1E–F | "Reppu" 17 Experimental carrier-borne fighter | A7M1 | Mitsubishi | Homare 41, 18 cyl. radial | Nakajima | Expected in late 1944. |
| IRVING 11 | ..... | 2E–F | "Gekko" night fighter, Model 11 (13 Experimental 2-engine land fighter) | J1N1–S | Nakajima | Sakae 21, 14 cyl. radial | Nakajima | See also "Navy Reconnaissance." In use as night fighter. Originally listed with Sakae 21 and 22 (22 reduction gear affects opposite prop. rotation). |
| IRVING 12 | ..... | 2E–F | "Gekko" night fighter, Model 12 | ..... | ..... | ..... | ..... | |

| Current Allied Code Name | Former Code Name | Recognition Type | Japanese | | Assembled By | Engine | Engine Made By | Comments |
|---|---|---|---|---|---|---|---|---|
| | | | Description | Model-Type Symbols | | | | |
| **NAVY FIGHTERS—Continued** | | | | | | | | |
| JACK 11 | ..... | 1E–F | "Raiden" fighter, Model 11 (14 Experimental interceptor fighter, modified) | J2M2 | Mitsubishi | Kasei 23, 14 cyl. radial | Mitsubishi | J2M1 was the experimental version, and J2M2 is now in production with 4-blade prop. and heavier armament. |
| JACK 12 | ..... | 1E–F | Ditto Model 12 | J2M3 | Mitsubishi | ..... | ..... | ..... |
| GEORGE 11 | ..... | 1E–F | "Shiden" fighter (15 Experimental interceptor fighter) | N1K2–J | Kawanishi | Homare 21, 18 cyl. radial | Nakajima | In production. N1K1–J was the experimental version. N1K2–J has modified fuselage and additional armament. |
| REX 11 | ..... | 1E–FFP | "Kyofu" fighter seaplane, Model 11 (15 Experimental fighter seaplane) | N1K1 | Kawanishi | Kasei 24, 14 cyl. radial | Mitsubishi | In production. Possible replacement for RUFE. Contra rotating props. |
| LUKE 11 | ..... | F | "Jinrai" 17 Experimental interceptor fighter | J4M1 | Mitsubishi | Ha 43, Model 41 | ..... | Twin boom, reported to have 2 x 20 mm. and 2 x 30 mm. guns. |
| **NAVY RECONNAISSANCE** | | | | | | | | |
| BABS 11 | Babs | 1E–R | Type 98 land recce plane, Model 11 | C5M1 | Mitsubishi | Zuisei 12, 14 cyl. radial | Mitsubishi | Obsolete. BABS was used by both JAAF and JNAF. One of 2 planes known to be used by both services, the Army's DINAH, being the other. |
| BABS 12 | Babs | 1E–R | Type 98 land recce plane, Model 12 | C5M2 | Mitsubishi | Sakae 12, 14 cyl. radial | Nakajima | Obsolete. May have Sakae 21 (Ha 35 Model 21). |
| JUDY 11 | Judy | 1E–R | Type 2 carrier-borne recce plane, Model 11 (13 Experimental carrier bomber) | D4Y1–C | Aichi | Atsuta 21, 12 cyl. inline | Aichi | See also "Navy Dive Bombers." Suisei Model 11 converted to recce. |
| JUDY 12 | Judy | 1E–R | Type 2 carrier-borne recce plane, Model 12 | D4Y2–R | ..... | Atsuta 31, 12 cyl. inline | Aichi | Converted to use 2–K8 cameras. |
| MYRT 11 | ..... | 1E–R | "Saiun" carrier-borne recce plane, Model 11 (17 Experimental carrier-borne recce) | C6N1 | Nakajima | Homare 21, 18 cyl. radial | Nakajima | Fastest Navy recce plane. |

| Current Allied Code Name | Former Code Name | Recognition Type | Japanese | | Assembled By | Engine | Engine Made By | Comments |
|---|---|---|---|---|---|---|---|---|
| | | | Description | Model-Type Symbols | | | | |
| **NAVY RECONNAISSANCE—Continued** | | | | | | | | |
| SLIM 11 | Slim | 1E–RFP | Type 96 small recce seaplane, Model 11 | E9W1 or E9N1 | Watanabe or Nakajima | Amakaze 12, 9 cyl. radial | Tokyo Gasu Denki | Obsolete. Used as submarine-borne recce. |
| JAKE 11 | Jake | 1E–RFP | Type 0 recce seaplane, Model 11 (12 Experimental 3-seater recce seaplane) | E13A1 | Watanabe | Kinsei 43 or 44, 14 cyl. radial | Mitsubishi 43; Hiro and Mitsubishi 44 | Newer planes mount 20 mm. gun. |
| GLEN 11 | Glen | 1E–RFP | Type 0 small seaplane, Model 11 | E14Y1 | Yokosuka? | Amakaze 11, 9 cyl. radial | Tokyo Gasu Denki | One source gives "Watanabe" as the maker. Used as submarine-borne recce. |
| NORM 11 | ..... | 1E–RFP | "Shiun" high-speed recce seaplane, Model 11 (14 Experimental high-speed recce seaplane) | E15K1 | Kawanishi? | Kasei 24, 14 cyl. radial | Mitsubishi | Scheduled for production at end of 1943. May be "15 Experimental." Contra rotating props. |
| PAUL 11 | ..... | 1E–2S–RFP | "Zuiun" 2-seater recce seaplane, Model 11 (14 Experimental recce seaplane 2-seater) | E16A1 | Aichi | Kinsei 54, 14 cyl. radial | Mitsubishi | Kinsei 54 has MG synchronizer. Used as dive bomber. In production. Exp. version had Kinsei 51 engine. |
| PETE 11 | Pete | 1E–OFP | Type 0 observation plane, Model 11 | F1M2 | Sasebo and Mitsubishi | Zuisei 13, 14 cyl. radial | Mitsubishi | F1M1 and F1A1 were the experimental versions. |
| IRVING 11 | ..... | 2E–R | Type 2 land-recce plane, Model 11 (13 Experimental land fighter) | J1N1 | Nakajima | Sakae 21, 14 cyl. radial | Nakajima | See also "Navy fighters." |
| **NAVY TORPEDO PLANES** | | | | | | | | |
| KATE 11 | Kate Mk 1 | 1E–TB | Type 97 carrier-borne attack plane, Model 11 | B5N1 | Nakajima | Hikari 3, 9 cyl. radial | Nakajima | Obsolete. |
| KATE 61 | Kate Mk 2 | 1E–TB | Type 97 carrier-borne attack plane, Model 61 | B5M1 | Mitsubishi? | Kinsei 43, 14 cyl. radial | Mitsubishi | Obsolete. Also listed as "B5N1 modified." |
| KATE 12 | Kate Mk 3 | 1E–TB | Type 97 carrier-borne attack plane, Model 12 | B5N2 | Hiro, Aichi and Nakajima | Sakae 11, 14 cyl. radial | Nakajima | Obsolescent. Being replaced by JILL. |

| Current Allied Code Name | Former Code Name | Recognition Type | Japanese | | Assembled By | Engine | Engine Made By | Comments |
|---|---|---|---|---|---|---|---|---|
| | | | Description | Model-Type Symbols | | | | |
| **NAVY TORPEDO PLANES—Continued** | | | | | | | | |
| JILL 11 | Jill | 1E–TB | "Tenzan" carrier-borne attack plane, Model 11 (14 Experimental carrier-borne attack plane) | B6N1 | Nakajima | Mamoru 11, 14 cyl. radial | Nakajima | First version of JILL. Still being produced but less than B6N2. |
| JILL 12 | Jill | 1E–TB | "Tenzan" carrier-borne attack plane, Model 12 | B6N2 | Nakajima | Kasei 25, 14 cyl. radial | Mitsubishi | Principal torpedo plane now in production. |
| GRACE 11 | ..... | 1E–TB | "Ryusei" 16 Experimental carrier-borne attack plane | B7A1 | Aichi | Homare 11, 18 cyl. radial | Nakajima | Possible replacement of Aichi's KATE. May also be used as dive bomber. |
| **NAVY DIVE BOMBERS** | | | | | | | | |
| VAL 11 | Val Mk 1 | 1E–TB | Type 99 carrier-borne bomber, Model 11 | D3A1 | Aichi | Kinsei 44, 14 cyl. radial | Mitsubishi and Hiro | Obsolete. |
| VAL 22 | Val Mk 2 | 1E–DB | Type 99 carrier-borne bomber, Model 22 | D3A2 | Aichi | Kinsei 54, 14 cyl. radial | Mitsubishi | Still operational. Being converted to trainer. |
| JUDY 11 | Judy | 1E–DB | "Suisei" carrier-borne bomber, Model 11 (13 Experimental carrier-borne bomber) | D4Y1 | Aichi | Atsuta 21, 12 cyl. inline | Aichi | See also "Navy Reconnaissance." |
| JUDY 12 | ..... | 1E–DB | "Suisei" carrier-borne bomber, Model 12 | D4Y2 | Aichi | Atsuta 31, 12 cyl. inline | Aichi | In service. |
| JUDY 22 | ..... | 1E–DB | "Suisei" carrier-borne bomber, Model 22 | ..... | ..... | Atsuta 31, 12 cyl. inline | Aichi | ..... |
| JUDY 21 | ..... | 1E–DB | "Suisei" carrier-borne bomber, Model 21 | ..... | Aichi? | Atsuta 21, 12 cyl. inline | Aichi | Described as "Suisei Model 11, converted for catapult use." |

| Current Allied Code Name | Former Code Name | Recognition Type | Japanese | | Assembled By | Engine | Engine Made By | Comments |
|---|---|---|---|---|---|---|---|---|
| | | | Description | Model-Type Symbols | | | | |
| **NAVY BOMBERS** | | | | | | | | |
| NELL 11 | Nell Mk 1 | 2E–B | Type 96 land attack plane, Model 11 | G3M1 | Mitsubishi | Kinsei 41, 42 or 45, 14 cyl. radial | Mitsubishi | Obsolete. See also "Navy Transports." |
| NELL 21 | Nell Mk 1 | 2E–B | Type 96 land attack plane, Model 21 | G3M2 | Mitsubishi | Kinsei 41, 42 or 45, 14 cyl. radial | Mitsubishi | Obsolete. Mounted 20 mm. top gun aft. |
| NELL 23 | Nell Mk 3 | 2E–B | Type 96 land attack plane, Model 23 | G3M3 | Nakajima | Kinsei 51, 52 or 53, 14 cyl. radial | Mitsubishi | Obsolescent. NELL is now used mainly for training and transport. Also listed as "G3M2 modified." |
| BETTY 11 | Betty Mk 1 | 2E–B | Type 1 land attack plane, Model 11 | G4M1 | Mitsubishi | Kasei 11 or 15, 14 cyl. radial | Mitsubishi and Hiro | See also "Navy Transports." When used as a transport, model-type symbol is not given. |
| BETTY 22 | Betty Mk 2 | 2E–B | Type 1 land attack plane, Model 22 | G4M2 | Mitsubishi | Kasei 21, 14 cyl. radial | Mitsubishi | Formerly called "Model 12." In production. Overload weight 33,000 lbs. |
| BETTY 24 | ..... | 2E–B | Type 1 land attack plane, Model 24 | ..... | Mitsubishi | Kasei 25, 14 cyl. radial | Mitsubishi | May be a temporary designation. |
| BETTY 25 | ..... | 2E–B | Type 1 land attack plane, Model 25 | ..... | Mitsubishi | Kasei 27, 14 cyl. radial | Mitsubishi | Formerly called "Model 14." May still be a temporary designation |
| BETTY 34 | ..... | 2E–B | Type 1 land attack plane, Model 34 | G4M3 | Mitsubishi | Kasei 25, 14 cyl. radial | Mitsubishi | Formerly called "Model 22." In production. Reported "Completely bullet proofed." |
| LIZ 11 | Liz | 4E–B | Type 2 land attack plane, Model 11 (13 Experimental land attack plane) | G5M1 | Mitsubishi | Kasei 11 or Mamoru 11?, 14 cyl. radial | Mitsubishi and Nakajima | Believed unsuccessful. Redesigned by Nakajima as "G5N1." |
| LIZ 11 | Liz | 4E–B | "Shinzan" land attack plane, Model 11 | G5N1 | Nakajima | Mamoru 11 , 14 cyl. radial | Nakajima | In production. Used as transport. Reports have referred to Kasei 21 engines also. |
| LIZ 12? | Liz | 4E–B | Ditto Model 12 | G5N2 | Nakajima | Mamoru 12, 14 cyl. radial | Nakajima | Model designation is uncertain. |
| FRANCES 11 | ..... | 2E–B | "Ginka" bomber (15 Experimental land-land-based bomber Y–20) | P1Y1 | Nakajima | Homare 11, 18 cyl. radial | Nakajima | In production. |
| FRANCES 12? | ..... | 2E– | Hakko night fighter | P1Y1–S | Yokosuka Kaigun Gijutsushe | Kasei 25, 14 cyl. radial | Mitsubishi | "Ginka" converted to night fighter. The Kyokko version may be a night attack torpedo plane. |

| Current Allied Code Name | Former Code Name | Recognition Type | Japanese | | Assembled By | Engine | Engine Made By | Comments |
|---|---|---|---|---|---|---|---|---|
| | | | Description | Model-Type Symbols | | | | |
| **NAVY TRANSPORTS** | | | | | | | | |
| TESS 11 (Trans) | Tess | 2E–Trans | Type O transport plane, Model 11 (D–2 transport plane) | L2D2 | Showa | Kinsei 43, 14 cyl. radial | Mitsubishi | Evolved from Douglas "D–C 2." |
| TESS 11 (Cargo) | Tess | 2E–Trans | Type 0 cargo plane, Model 11 (D–2 cargo plane) | L2D2–L1 | ..... | Kinsei 43, 14 cyl. radial | Mitsubishi | Not same as TESS transport or passenger transport. |
| TESS 11 (Pass.) | Tess | 2E–Trans | Type 0 passenger transport | ..... | ..... | Kinsei 43?, 14 cyl. radial | Mitsubishi | ..... |
| TABBY 22 (Trans) | Tess | 2E–Trans | Type 0 transport plane, Model 22 | L2D3 | Showa? | Kinsei 51, 52 or 53, 14 cyl. radial | Mitsubishi | Evolved from Douglas "D–C 3" |
| TABBY 22 (Cargo) | Tess | 2E–Trans | Type 0 cargo plane, Model 22 | ..... | ..... | Kinsei 53, 14 cyl. radial | Mitsubishi | Transport version converted to cargo. |
| TABBY 32 (Pass.) | Tess | 2E–Trans | Type 0 passenger transport, Model 32 | ..... | ..... | Kinsei 53? 14 cyl. radial | Mitsubishi | ..... |
| NELL 11 (Trans) | Nell Transport | 2E–Trans | Type 96 land transport, Model 11 | L3Y1 | ..... | Kinsei 41 or 42, 14 cyl. radial | Mitsubishi | Obsolete. See also "Navy Bombers." Also listed as "G3M1–D." |
| NELL 21 (Trans) | Nell Transport | 2E–Trans | Type 96 land transport, Model 21 | L3Y2 | Mitsubishi | Kinsei 41 or 42, 14 cyl. radial | Mitsubishi | Obsolete. Also listed as "G3M2–D special transport." |
| NELL 22 (Trans) | Nell Transport | 2E–Trans | Type 96 land transport, Model 22 | ..... | Mitsubishi | Kinsei 45, 14 cyl. radial | Mitsubishi | Obsolescent. |
| NELL 23 (Trans) | Nell Transport | 2E–Trans | Type 96 land transport, Model 23 | ..... | Nakajima | Kinsei 52, 14 cyl. radial | Mitsubishi | Obsolescent. |
| BETTY 11 (Trans) | ..... | 2E–Trans | Type 1 land attack plane | ..... | Mitsubishi | Kasei 11 or 15, 14 cyl. radial | Mitsubishi or Hiro | Bomber modified to serve as transport. |
| **NAVY FLYING BOATS** | | | | | | | | |
| MAVIS 11 | Mavis | 4E–FB | Type 97 flying boat, Model 11 | H6K2 | Kawanishi | Kinsei 43, 14 cyl. radial | Mitsubishi | Obsolete. |
| MAVIS 11 (Trans) | Mavis Transport | 4E–FB Trans | Type 97 transport flying boat, Model 11 | H6K3 | Kawanishi | Kinsei 46?, 14 cyl. radial | Mitsubishi | Type 97 flying boat, model 11 modified. |
| MAVIS 22 | Mavis | 4E–FB | Type 97 flying boat, Model 22 | H6K4 | Kawanishi | Kinsei 43 or 46, 14 cyl. radial | Mitsubishi | ..... |
| MAVIS 23 | Mavis | 4E–FB | Type 97 flying boat, Model 23 | H6K5 | Kawanishi | Kinsei 51 or 53, 14 cyl. radial | Mitsubishi | ..... |

| Current Allied Code Name | Former Code Name | Recognition Type | Japanese | | Assembled By | Engine | Engine Made By | Comments |
|---|---|---|---|---|---|---|---|---|
| | | | Description | Model-Type Symbols | | | | |
| **NAVY FLYING BOATS —Continued** | | | | | | | | |
| EMILY 11 | Emily | 4E–FB | Type 2 flying boat, Model 11 | H8K1 | Kawanishi | Kasei 12, 14 cyl. radial | Mitsubishi | 7.7 MG in front and sides. |
| EMILY 12 | Emily | 4E–FB | Type 2 flying boat, Model 12 | H8K2 | Kawanishi | Kasei 22, 14 cyl. radial | Mitsubishi | Fuel tank armor increased weight by 900 kg; 20 mm. cannon replace 7.7 MG. |
| EMILY 22 | Emily | 4E–FB | Type 2 flying boat, Model 22 | H8K3 | Kawanishi | Kasei 22, 14 cyl. radial | Mitsubishi | Model 12 "made bullet-proof." |
| EMILY 32 (Trans) | Emily Transport | 4E–FB Trans | "Seiku" transport flying boat, Model 32 | H8K2–L | ..... | Kasei 22, 14 cyl. radial | Mitsubishi | In production 1943. |
| CHERRY 11 | Cherry | 2E–FB | Type 99 medium flying boat, Model 11 | H5Y1? | ..... | Shinten 21, 14 cyl. radial | Nakajima | ..... |
| **ARMY FIGHTERS** | | | | | | | | |
| NATE 1 | Nate | 1E–F | Type 97 fighter | Ki 27 | Nakajima | Type 97, 650 hp., 9 cyl. radial | Nakajima | Obsolete. Used as trainer. |
| OSCAR 1 | Oscar Mk 1 | 1E–F | Type 1 fighter, Model 1 | Ki 43 | Nakajima | Type 99, 950 hp., 14 cyl. radial | Nakajima | Obsolete. |
| OSCAR 2 | Oscar Mk 2 | 1E–F | Type 1 fighter, Model 2 | Ki 432 | Nakajima | Type 2, 1150 hp., 14 cyl. radial | Nakajima and Kawasaki | Blunt wing tips. Early models had round wing tips and longer span. |
| OSCAR 3 | ..... | ..... | Type 1 fighter, Model 3 | ..... | ..... | ..... | ..... | Possibly operational in late 1944. |
| TOJO 1 | Tojo | 1E–F | Type 2 fighter, Model 1 | Ki 44 | Nakajima | Type 100, 1250 hp., 14 cyl. radial | Nakajima | ..... |
| TOJO 2 | Tojo | 1E–F | Type 2 fighter, Model 2 | Ki 442 | Nakajima | Type 2, 1450 hp., 14 cyl. radial | Nakajima | Now operational in all Army areas. |
| NICK 1 | Nick | 2E–F | Type 2 heavy fighter | Ki 45 | Kawasaki | Type 1, 1050 hp., 14 cyl. radial | Mitsubishi | Night fighter. |
| TONY 1 | Tony | 1E–F | Type 3 fighter, Model 1 | Ki 61 | Kawasaki | Type 2, 1100 hp., 12 cyl. inline | Kawasaki | Engine appears to be based on DB 601 A. |
| ROB 1 | ..... | 1E–F | High-speed fighter | Ki 64 | Kawasaki | Ha 72, Model 11, (Ha 201) inline | ..... | May replace TONY. Engine may be based on later model Daimler Benz. |
| STEVE 1 | ..... | 1E–F | Type 3 super-high-speed fighter | Ki 73 | ..... | Ha 42, Model 11, (Ha 104) 2000 hp., 18 cyl. radial | Mitsubishi | ..... |
| PAT 1 | ..... | 1E–F | Super-range high-speed fighter | Ki 74 | Tachikawa | Ha 221 | ..... | ..... |
| FRANK 1 | ..... | 1E–F | Single-seater fighter | Ki 84 | Nakajima | Ha 45, Model 21, 2000 hp, 18 cyl. radial | Nakajima | In production. |

| Current Allied Code Name | Former Code Name | Recognition Type | Japanese | | Assembled By | Engine | Engine Made By | Comments |
|---|---|---|---|---|---|---|---|---|
| | | | Description | Model-Type Symbols | | | | |
| **ARMY RECONNAISSANCE AND LIGHT BOMBERS** | | | | | | | | |
| MARY 1 | Mary | 1E–R | Type 98 light bomber | Ki 32 | Kawasaki | Type 98, 800 (or 850) hp., 12 cyl. inline | ..... | Obsolete. Used as trainer. |
| IDA 1 | Ida | 1E–R | Type 98 direct-cooperation plane | Ki 36 | Tachikawa? | Type 98, 450 hp., 9 cyl. radial | Probably Nakajima | Obsolescent. Used as trainer. |
| SONIA 1 | Sonia | 1E–R | Type 99 "A" recce plane | Ki 51 | Rikugun Koku Kosho | Type 99, Model 2, 900 hp., 14 cyl. radial | Mitsubishi | Obsolescent. |
| SONIA 1 | Sonia | 1E–R | Type 99 "B" assault plane | Ki 51 | Mitsubishi | Type 99, Model 2, 900 hp., 14 cyl. radial | Mitsubishi | Has been used for ground attack and mistaken for VAL. |
| DINAH 1 | Dinah | 2E–R | Type 100 HQ recce plane, Model 1 | Ki 46 | Mitsubishi | Type 99, 900 hp., 14 cyl., radial | Mitsubishi | Obsolete. |
| DINAH 2 | Dinah Mk 2 | 2E–R | Type 100 HQ recce plane, Model 2 | Ki 462 | Mitsubishi | Type 1, 1050 hp., 14 cyl., radial | Mitsubishi | Principal recce plane. Used by both JAAF and JNAF. |
| DINAH 3 | Dinah Mk 3 | 2E–R | Type 100 HQ recce plane, Model 3 | Ki 463 | Mitsubishi | Ha 33, Model 62 (Ha 112, Model 2) 14 cyl. radial | Mitsubishi | In production. |
| CLARA 1 * | ..... | 2E–R | HQ recce plane | Ki 70 | Tachikawa | Ha 42, Model 11, (Ha 104) 2000 hp., 18 cyl. radial | ..... | May be in production. |
| EDNA 1 | ..... | 2E–R | HQ recce plane | Ki 71 | "Air Depot" | Ha 33, Model 51, (Ha 112) 14 cyl. radial | Mitsubishi | May be in production. |
| **ARMY BOMBERS** | | | | | | | | |
| SALLY 1 | Sally Mk 1 | 2E–B | Type 97 heavy bomber, Model 1 | Ki 21 | Mitsubishi | Type 97, 850 hp., 14 cyl. radial | Nakajima? | Obsolete. Used as trainer. |
| SALLY 2 | Sally Mk 2 | 2E–B | Type 97 heavy bomber, Model 2 | Ki 57? | Mitsubishi | Type 100, 1450 hp., 14 cyl. radial | Mitsubishi | Former SALLY Mks II and III now identified as Jap Model 2. |
| LILY 1 | Lily Mk 1 | 2E–B | Type 99 light bomber, Model 1 | Ki 48 | Kawasaki | Type 99, 950 hp., 14 cyl. radial | Nakajima and Kawasaki | Obsolescent. |
| LILY 2 | Lily Mk 2 | 2E–B | Type 99 light bomber, Model 2 | Ki 482 | Kawasaki | Type 2, 1150 hp., 14 cyl., radial | Nakajima and Kawasaki | Version with dive brakes may be LILY 3. Also used as trainer. |
| HELEN 1 | Helen | 2E–B | Type 100 heavy bomber, Model 1 | Ki 49 | Nakajima | Type 100, 1250 hp., 14 cyl. radial | Nakajima | Obsolescent. |
| HELEN 2 | Helen | 2E–B | Type 100 heavy bomber, Model 2 | Ki 492 | Nakajima | Type 2, 1450 hp., 14 cyl. radial | Nakajima | ..... |
| HELEN 3 | Helen | 2E–B | Type 100 heavy bomber, Model 3 | Ki 493 | Nakajima | Ha 47, Model 11, (Ha 117) 2300 hp. | ..... | Possibility-production status not known. |

| Current Allied Code Name | Former Code Name | Recognition Type | Japanese | | Assembled By | Engine | Engine Made By | Comments |
|---|---|---|---|---|---|---|---|---|
| | | | Description | Model-Type Symbols | | | | |
| **ARMY BOMBERS—Continued** | | | | | | | | |
| PEGGY 1 | ..... | 2E–B | ..... | Ki 67 | Mitsubishi | Ha 42, Model 11 (Ha 104) 2000 hp., 18 cyl. radial | Mitsubishi? | In production. |
| **ARMY TRANSPORTS** | | | | | | | | |
| THORA 1 | Thora | 2E–Trans | Type 97 transport plane | Ki 34 | Nakajima | Type 96, 650 hp., radial | Nakajima | Evolved from the Nakajima "AT" Commercial. |
| THORA 2 | Thora | 2E–Trans | Type 97 transport plane | ..... | Nakajima | Type 97, 650 hp., radial | Nakajima | ..... |
| THELMA 1 | Thelma | 2E–Trans | Type RO transport plane | Ki 56 | Kawasaki | Type 99, 950 hp., 14 cyl. radial | Nakajima and Kawasaki | Evolved from the "Lockheed 14." |
| THELMA 1 (Cargo) | Thelma | 2E–Trans | Type RO cargo transport plane | Ki 56 | Kawasaki | Type 99, Model 2, 900 hp., 14 cyl. radial | Mitsubishi | ..... |
| TOPSY 1 | Topsy | 2E–Trans | Type 100 transport plane, Model 1 | Ki 57 | Mitsubishi | Type 97, 850 hp., 14 cyl. radial | Nakajima | Evolved from the Mitsubishi "MC 20" Commercial. |
| THERESA 1 | Theresa | 2E–Trans | Type 1 transport plane | Ki 59 | Nippon KK | Type 98, 450 hp., radial | Nakajima? | Evolved from the N. K. K. "T. K. 3" Commercial. |

# ROMAJI DESIGNATIONS OF CODED AIRCRAFT

## Code Names vs Japanese Names

| | |
|---|---|
| EMILY (Transport) | SEIKU |
| FRANCES, Bomber | GINKA |
| FRANCES, Night Flying | HAKKO (and Kyokko) |
| GEORGE 11 | SHIDEN |
| GRACE | RYUSEI |
| IRVING, Night Fighter | GEKKO |
| JACK | RAIDEN |
| JILL | TENZAN |
| JUDY, Bomber | SUISEI |
| LIZ | SHINZAN |
| LUKE | JINRAI |
| MYRT | SAIUN |
| NORM | SHIUN |
| PAUL | ZUIUN |
| REX | KYOFU |
| SAM | REPPU |

## Japanese Names vs Code Names

| | |
|---|---|
| GEKKO | IRVING, Night Fighter |
| GINKA | FRANCES, Bomber |
| HAKKO (and Kyokko) | FRANCES, Night Flying |
| JINRAI | LUKE |
| KYOFU | REX |
| RAIDEN | JACK |
| REPPU | SAM |
| RYUSEI | GRACE |
| SAIUN | MYRT |
| SEIKU | EMILY, (Transport) |
| SHIDEN | GEORGE |
| SHINZAN | LIZ |
| SHIUN | NORM |
| SUISEI | JUDY, Bomber |
| TENZAN | JILL |
| ZUIUN | PAUL |

# "KI" NUMBERS OF CODED AIRCRAFT

| Ki Number | Code Name | Code Name | Ki Number |
|---|---|---|---|
| 21 | SALLY | CLARA | 70 |
| 27 | NATE | DINAH | 46 |
| 32 | MARY | EDNA | 71 |
| 34 | THORA | FRANK | 84 |
| 36 | IDA | HELEN | 49 |
| 43 | OSCAR | IDA | 36 |
| 44 | TOJO | LILY | 48 |
| 45 | NICK | MARY | 32 |
| 46 | DINAH | NATE | 27 |
| 48 | LILY | NICK | 45 |
| 49 | HELEN | OSCAR | 43 |
| 51 | SONIA | PAT | 74 |
| 56 | THELMA | PEGGY | 67 |
| 57* | TOPSY | ROB | 64 |
| 59 | THERESA | SALLY | 21 |
| 61 | TONY | SONIA | 51 |
| 64 | ROB | STEVE | 73 |
| 67 | PEGGY | THELMA | 56 |
| 70 | CLARA | THERESA | 59 |
| 71 | EDNA | THORA | 34 |
| 73 | STEVE | TOJO | 44 |
| 74 | PAT | TONY | 61 |
| 84 | FRANK | TOPSY* | 57 |

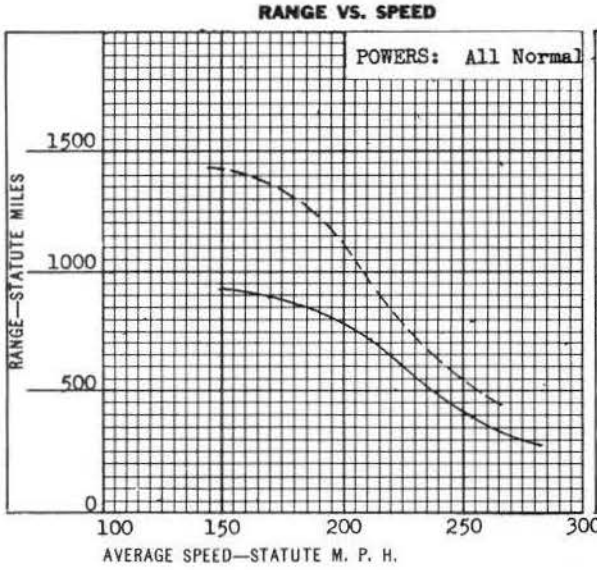
*Ki 57 markings have also been found on SALLY bombers.

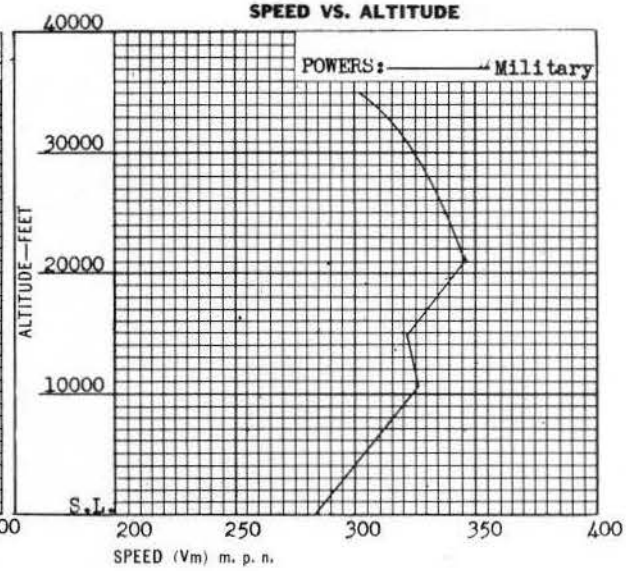
NOTES

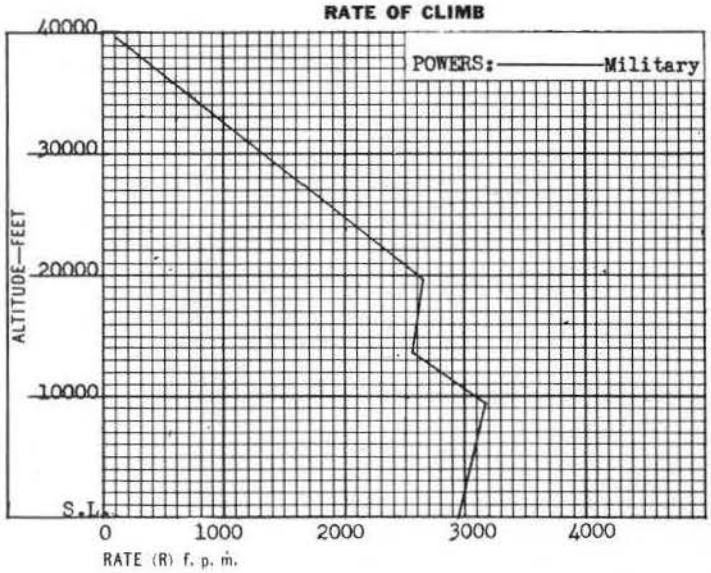
# ZEKE 32 (HAMP)

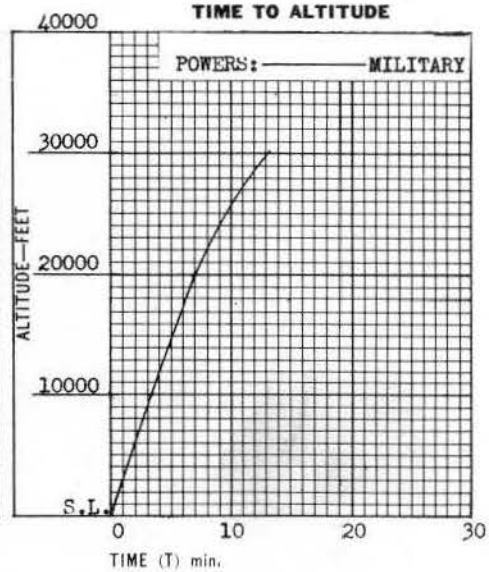
## RANGE * SPEED * CLIMB

| KEY | CONDITION | WEIGHT (lb.) | FUEL LOAD (lb.) | BOMBS—CARGO (lb.) |
|---|---|---|---|---|
| ——— | NORMAL FIGHTER | 5650 | 762 | None |
| - - - - - - - - - - - | OVERLOAD FIGHTER | 6260 | 1284 | None |




**DATE** December 1944

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# PERFORMANCE AND CHARACTERISTICS ZEKE 32 (HAMP)

## TAKE-OFF

| | Load | Feet |
|---|---|---|
| T.O. calm | 5650 | 492 |
| T.O. 25 kt. wind | 5650 | 202 |
| T.O. over 50' obstacle | | |
| Landing over 50' obstacle | | |

## CLIMB—CEILING

| @ 5650 lbs. | Feet | Min. |
|---|---|---|
| Rate @ S.L. | 2960 | 1 |
| Rate @19,700 ft. | 2640 | 1 |
| Time to 10,000' | | 3.3 |
| Time to 20,000' | | 7.0 |

Service ceiling 39,800'

## AIRCRAFT

Duty Fighter

Designation Type 0, Model 32

Description Low-wing Monoplane

Mfg. Mitsubishi

Engines 1 Crew 1

Construction All Metal

## SPEED

| @ 5650 lbs. | Mph. | Knts. | Altitude |
|---|---|---|---|
| Maximum | 284 | 246 | @ S. L. |
| Maximum | 346 | 300 | @ 21,000' |
| Cruising 75% | 200 | 174 | 1,500' |
| Economical | | | |

## BOMBS—CARGO

| | No. | Size | Total Lbs. |
|---|---|---|---|
| Normal | None | | |
| Maximum | 2 | 60 kg | 264 |

## ENGINES

| | H. P. | Altitude |
|---|---|---|
| Take-off | 1115 | S.L. |
| Normal | 980<br>860 | 6,500'<br>16,500' |
| Military | 1085<br>965 | 9,400'<br>19,700' |
| War Emerg. | 1180 | 7,500' |

Mfg. Nakajima & Ishakawajima

Model Sakae 21

Type Radial

Cylinders 14 Cooling Air

Supercharger 2 Speed

Propeller 3 Blade CS Diam. 10.0'

Fuel - Take-off 92 Cruising 92

## WEIGHTS

| | Lbs. |
|---|---|
| Empty | 4060 |
| Gross | 5650 |
| Overload | 6250 |

## FUEL

| | U.S. gal. | Imp. gal. |
|---|---|---|
| Built-in | 127 | 106 |
| Internal (Removable) | | |
| External (drop) | 87 | 72 |
| Maximum | 214 | 178 |

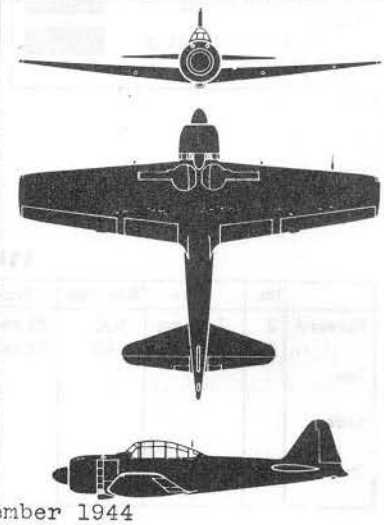
## RANGE AND RADIUS

| | Miles | | Speed | | Alt. feet | Fuel gal. | | Bombs lbs. | Cargo lbs. |
|---|---|---|---|---|---|---|---|---|---|
| | stat. | naut. | mph. | Knts. | | U. S. | Imp. | | |
| Maximum range (maximum fuel) | 1435 | 1255 | 144 | 125 | 1500 | 214 | 178 | None | None |
| At 75% Vmax. | 1130 | 981 | 200 | 174 | 1500 | 214 | 178 | None | None |
| Maximum range (normal fuel) | 925 | 803 | 150 | 130 | 1500 | 127 | 106 | None | None |
| Radius ( ) | | | | | | | | | |
| Radius ( ) | | | | | | | | | |

## DIMENSIONS

Span 36.2 Length 29.8

Height 9.2' Wing area 233 sq.ft.



## GENERAL DATA

ZEKE 32 believed out of production and will be encountered less frequently from now on.

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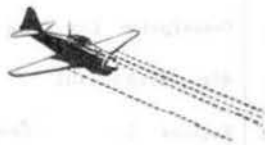
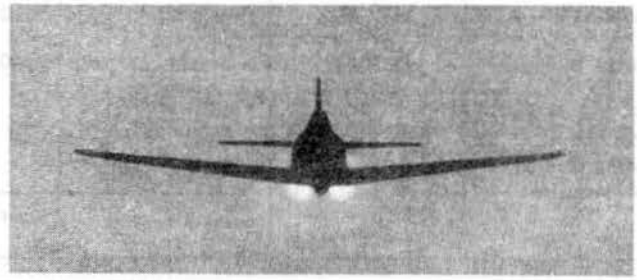
# ZEKE 32 (HAMP)

## FIELDS OF FIRE



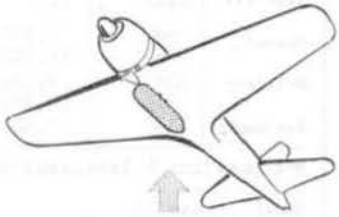
FORWARD GUNS "A", "B" AND "C"
¾-front view from above

## EXHAUST FLAME PATTERNS

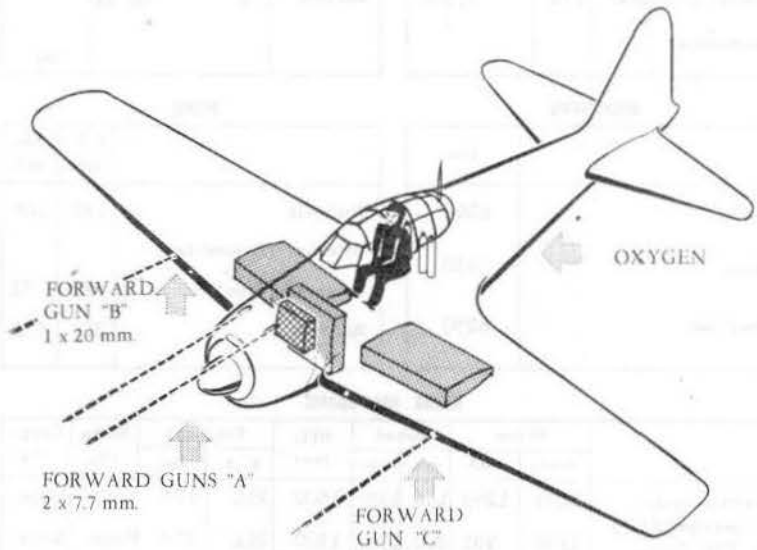


REAR VIEW

## VULNERABILITY



Auxiliary gas tank
Jettisonable




LEGEND

- Fuel tanks, unprotected
- Fuel tanks, self-sealing
- Oil tanks, unprotected
- Oil tanks, self-sealing

## ARMAMENT

| | No. | Size | Rds. Gun | Type | | No. | Size | Rds. Gun | Type |
|---|---|---|---|---|---|---|---|---|---|
| Forward | 2 | 7.7 mm | 500 | Fixed | Tail | | | | |
| | 2 | 20 mm | 60 | Fixed | | | | | |
| Top | | | | | Wing | | | | |
| Side | | | | | | | | | |
| Bottom | | | | | | | | | |

## TACTICAL DATA

Some late models have improved 20 mm cannon in wings-protrude from leading edge about 19 inches.

Effective range approx. 600 - 700 yards.

**DATE** December 1944

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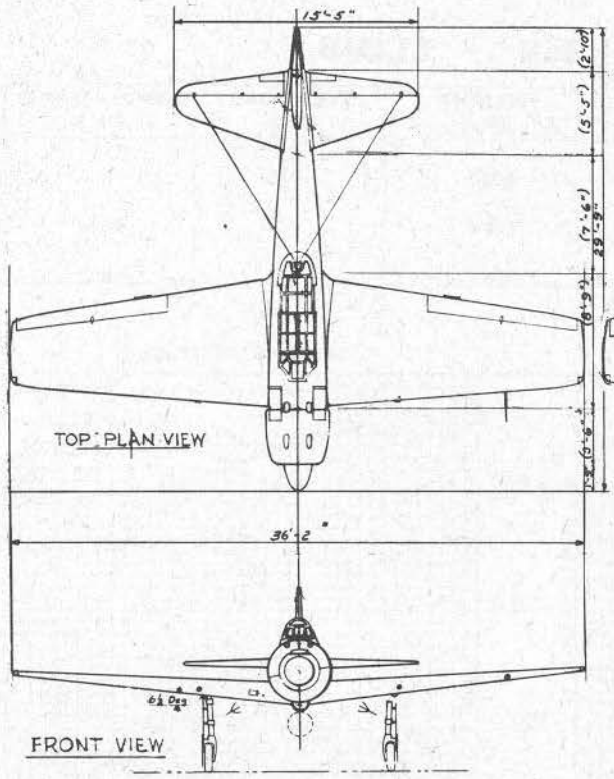
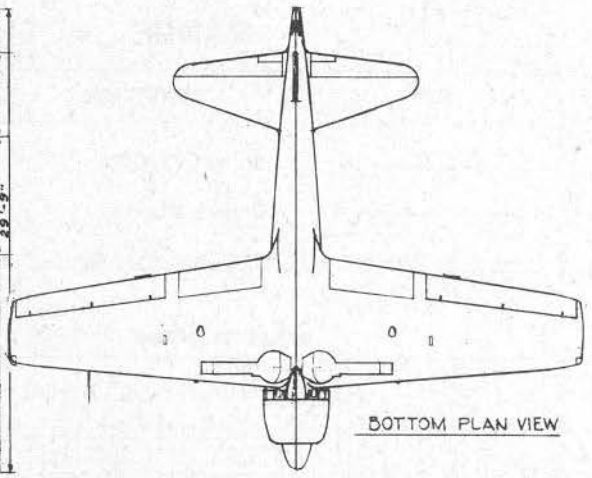
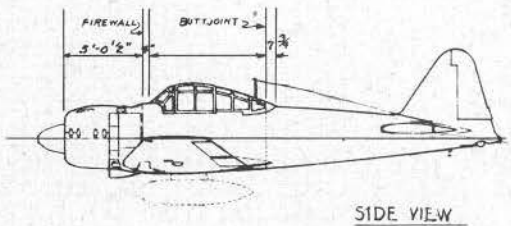
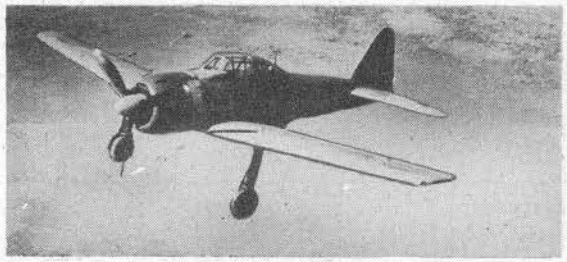
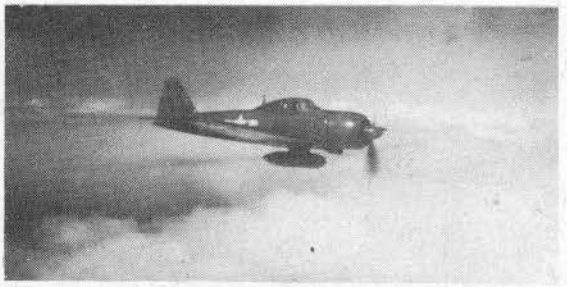
# ZEKE 32 (HAMP)

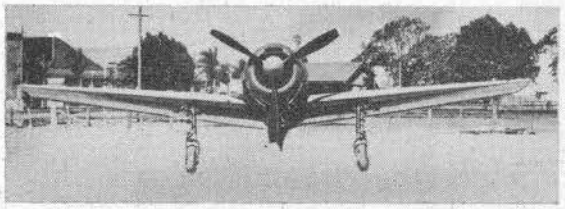


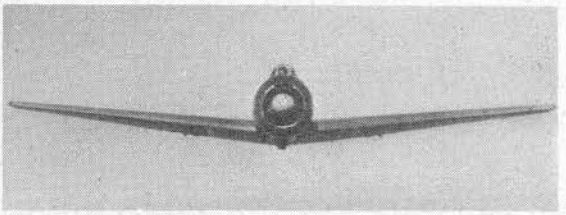



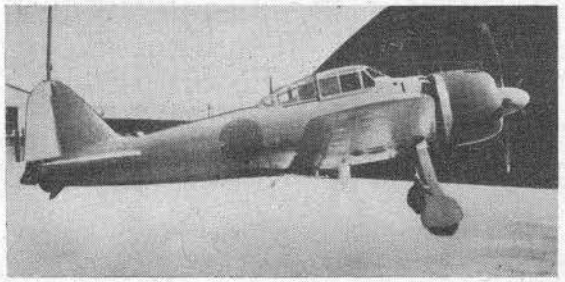



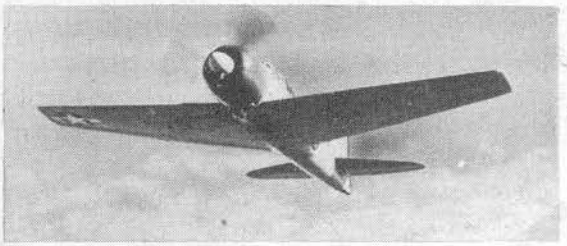













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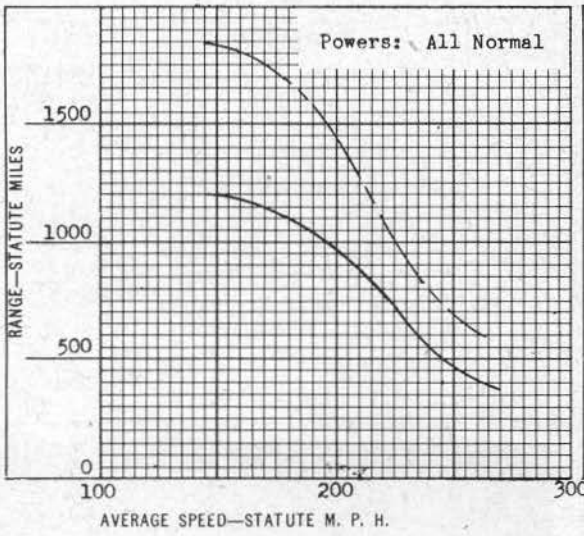
**DATE** December 1944

# ZEKE 52

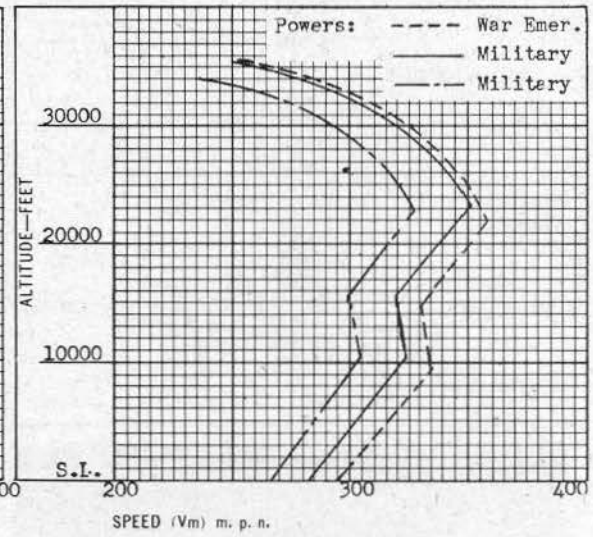
## RANGE • SPEED • CLIMB

| KEY | CONDITION | WEIGHT (lb.) | FUEL LOAD (lb.) | BOMBS—CARGO (lb.) |
|---|---|---|---|---|
| - - - - - - - - | Normal Fighter | 6026 | 936 | None |
| ———— | Normal Fighter | 6026 | 936 | None |
| ——— - ——— | Overload Fighter | 6600 | 1510 | None |

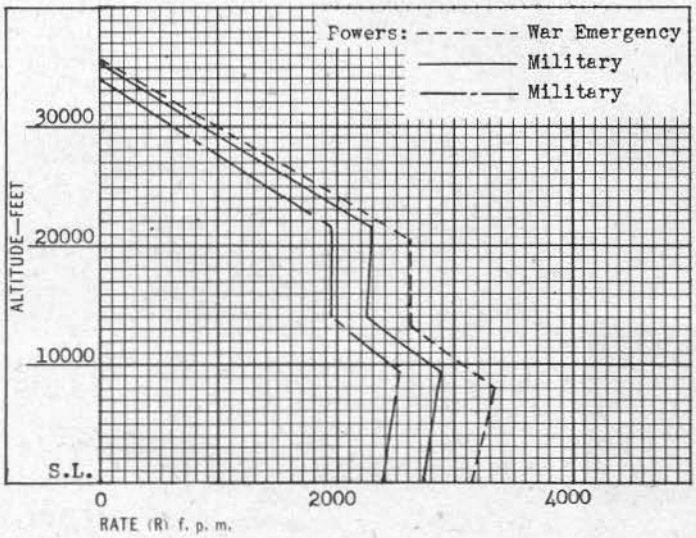
**RANGE VS. SPEED**



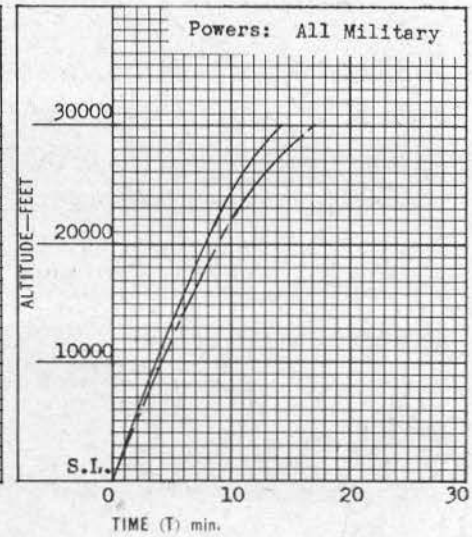

**SPEED VS. ALTITUDE**




**RATE OF CLIMB**




**TIME TO ALTITUDE**




**DATE** March 1945

**RESTRICTED**

# PERFORMANCE AND CHARACTERISTICS

# ZEKE 52

## TAKE-OFF

| | Load | Feet |
|---|---|---|
| **Runway Requirements** | 6026 | 975 |
| T.O. over 50' obstacle | | |
| Landing over 50' obstacle | | |
| * T.O. + 100% | | |

## CLIMB—CEILING

| @ 6026 lbs. | Feet | Min. |
|---|---|---|
| Rate @ S.L. | 3140 | 1 |
| Rate @ 8,000 ft. | 3340 | 1 |
| Time to 10,000' | | 3.6 |
| Time to 20,000' | | 7.8 |
| Service ceiling 35,100' | | |

## AIRCRAFT

Duty Fighter

Designation Type 0 Model 52

Description Low-wing Monoplane

Mfg. Mitsubishi & Nakajima

Engines 1 Crew 1

Construction All Metal

## SPEED

| @ 6026 lbs. | Mph. | Knts. | Altitude |
|---|---|---|---|
| Maximum WE | 295 | 256 | @ S. L. |
| Maximum WE | 358 | 310 | @ 22,000' |
| Military | 351 | 304 | 23,100' |
| Cruising | | | |
| Economical | | | |

## BOMBS—CARGO

| | No. | Size | Total Lbs. |
|---|---|---|---|
| Normal | | | |
| Maximum | 2 | 60 kg | 264 |
| or | 10 | 32 kg | 704 |

## ENGINES

| | H. P. | Altitude |
|---|---|---|
| Take-off | 1120 | S.L. |
| Normal | 830 | 1500' |
| Military | 1080 | 9300' |
| | 950 | 21600' |
| War Emerg. | 1210 | 8000' |

Mfg. Nakajima

Model Sakae 31 A

Type Radial

Cylinders 14 Cooling Air

Supercharger 2 Speed

Propeller 3-Blade Diam. 10' C.S.

Fuel - Take-off 92 Cruising 92

## WEIGHTS

| | Lbs. |
|---|---|
| Empty | 4236 |
| Gross Normal | 6026 |
| Overload | 6600 |

## FUEL

| | U.S. gal. | Imp. gal. |
|---|---|---|
| Built-in | 156 | 129 |
| Internal (Removable) | | |
| External (drop) | 87 | 72 |
| Maximum | 243 | 201 |

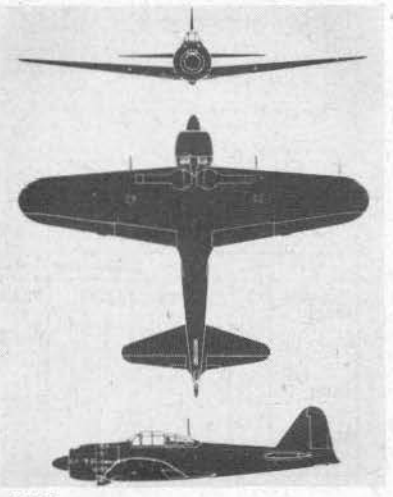
## RANGE AND RADIUS

| | Miles | | Speed | | Alt. | Fuel gal. | | Bombs | Cargo |
|---|---|---|---|---|---|---|---|---|---|
| | stat. | naut. | mph. | Knts. | feet | U. S. | Imp. | lbs. | lbs. |
| Maximum range (maximum fuel) | 1844 | 1600 | 146 | 126 | 1500 | 243 | 201 | None | None |
| At 75% Vmax. | 1478 | 1630 | 198 | 172 | 1500 | 243 | 201 | None | None |
| Maximum range (normal fuel) | 1200 | 1042 | 146 | 126 | 1500 | 156 | 129 | None | None |
| At 75% Vmax. | 948 | 823 | 202 | 175 | 1500 | 156 | 129 | None | None |
| Radius ( ) | | | | | | | | | |
| Radius ( ) | | | | | | | | | |

## DIMENSIONS

Span 36.1' Length 29.8'

Height 9.2' Wing area 230 sq.ft.



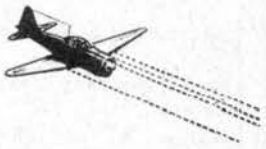
## GENERAL DATA

A maximum speed of only 340 mph has been obtained in flight tests.

102D-3

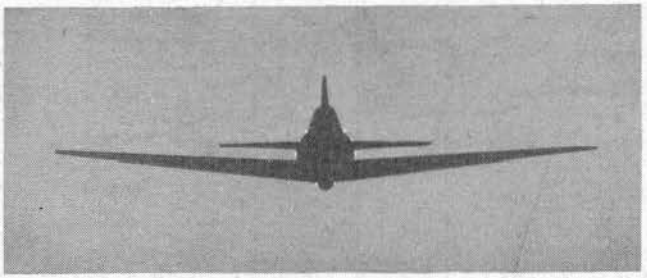
# ZEKE 52

## FIELDS OF FIRE



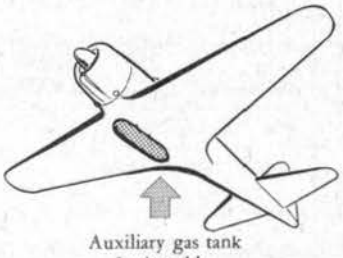
FORWARD GUNS "A", "B" AND "C"
¾-front view from above

## EXHAUST FLAME PATTERNS

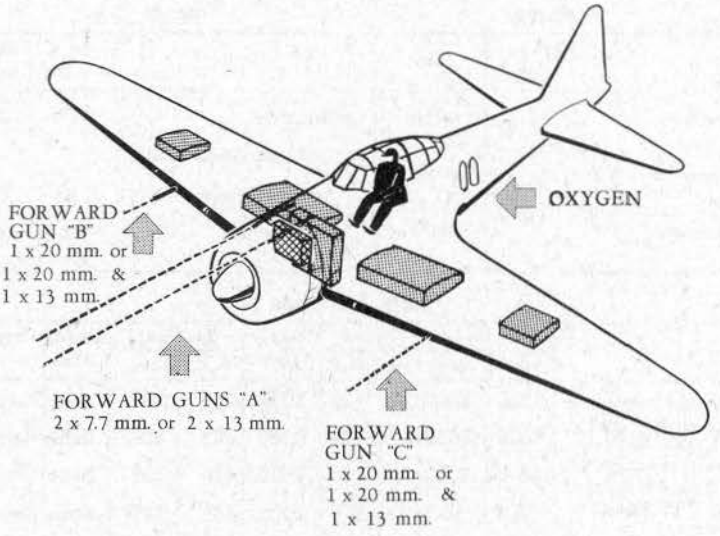


REAR VIEW

## VULNERABILITY



Auxiliary gas tank
Jettisonable




LEGEND

- Fuel tanks, unprotected
- Fuel tanks, self-sealing
- Oil tanks, unprotected
- Oil tanks, self-sealing

### ARMAMENT

| | No. | Size | Rds. Gun | Type | | No. | Size | Rds. Gun | Type |
|---|---|---|---|---|---|---|---|---|---|
| Forward Cowl | 2 | 7.7 mm or | 700 | Fixed | Tail | | | | |
| Top | 2 | 13.2 mm | | Fixed | Wing | 2 | 20 mm or | 100 | Fixed |
| Side | | | | | | 2 | 20 mm and | 100 | Fixed |
| Bottom | | | | | | 2 | 13.2 mm | | Fixed |

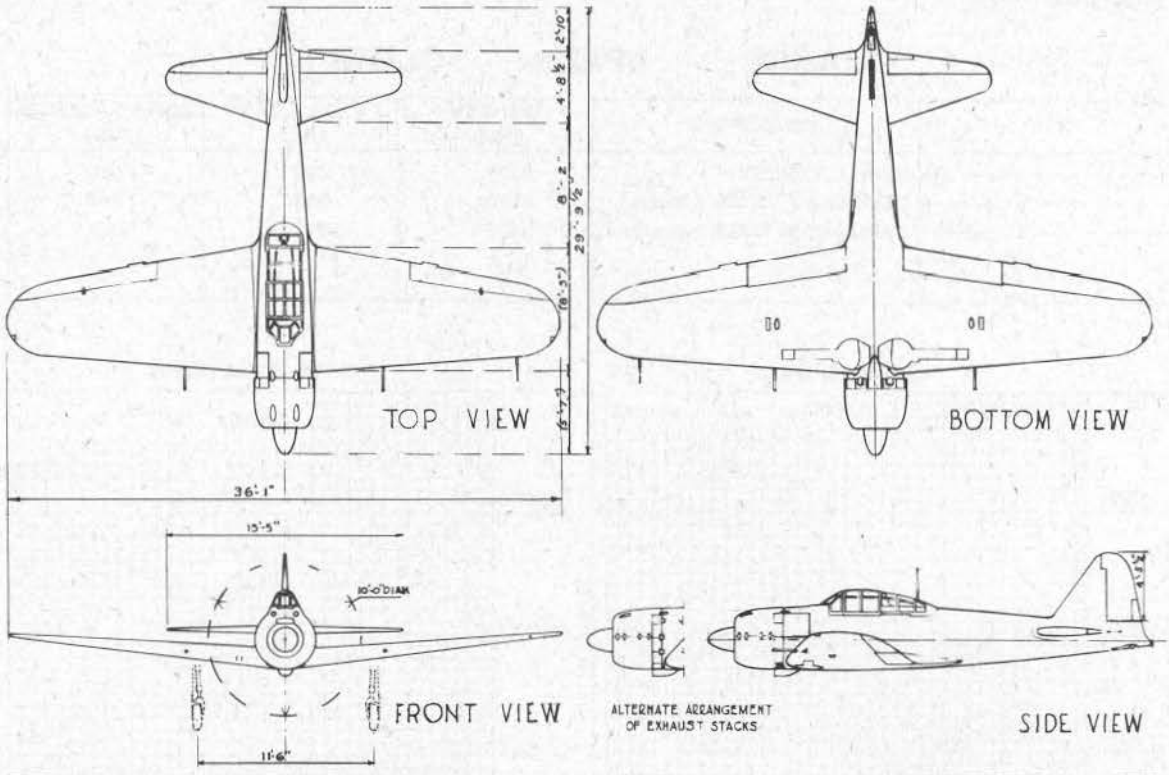
### TACTICAL DATA

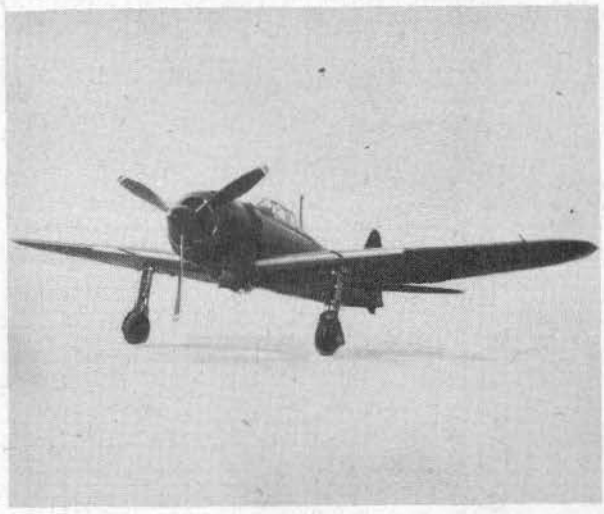
DATE March 1945

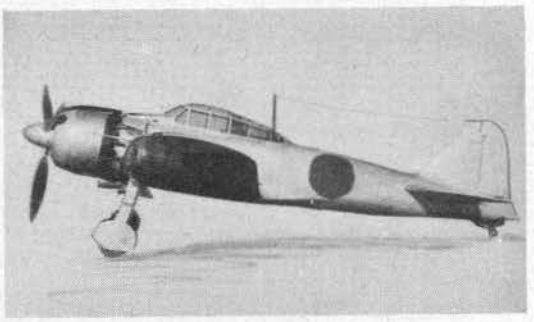
RESTRICTED

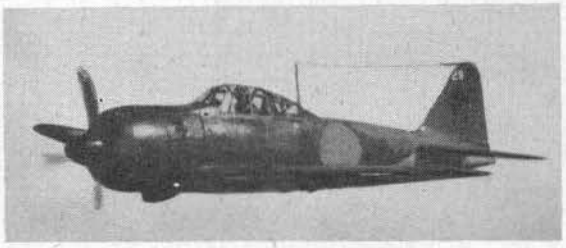
102D-4

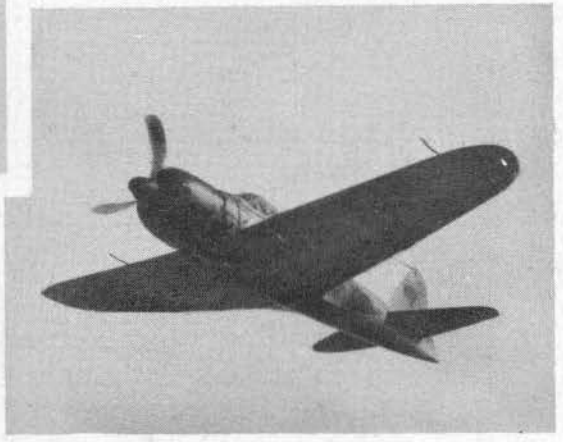
# ZEKE 52









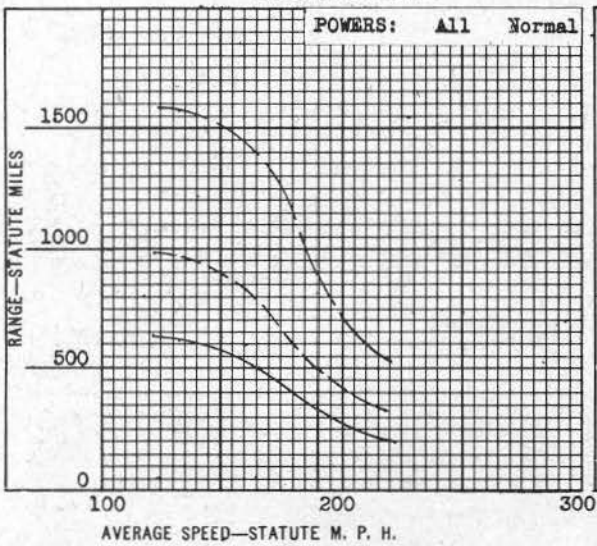
103A-1

# RUFE 11

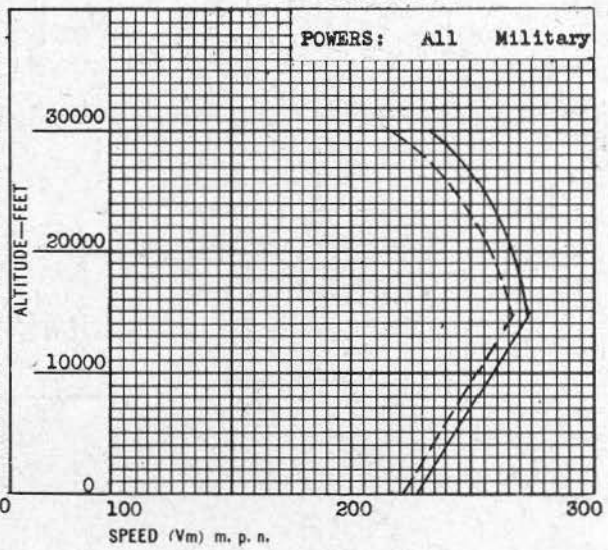
## RANGE * SPEED * CLIMB

| KEY | CONDITION | WEIGHT (lb.) | FUEL LOAD (lb.) | BOMBS—CARGO (lb.) |
|---|---|---|---|---|
| ——— | NORMAL FIGHTER | 5420 | 522 | None |
| - - - - - - - - - - | OVERLOAD FIGHTER (Bombs) | 6140 | 868 | 265 |
| —— —— —— | OVERLOAD FIGHTER (Max.Fuel) | 6405 | 1395 | None |

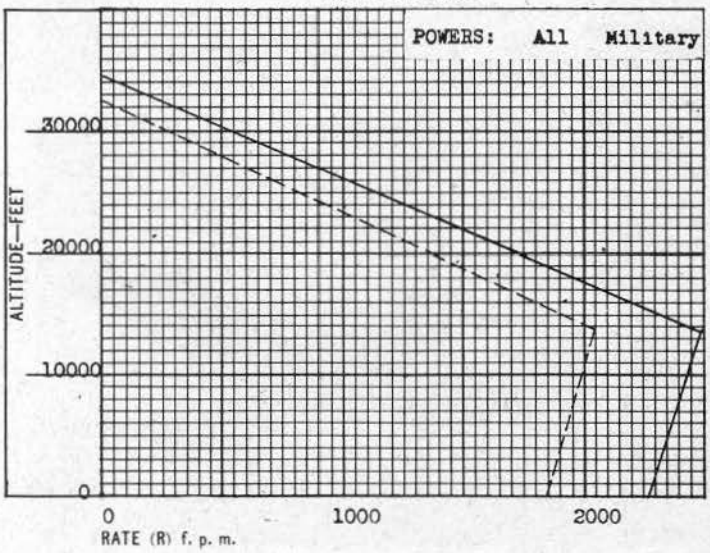
**RANGE VS. SPEED**



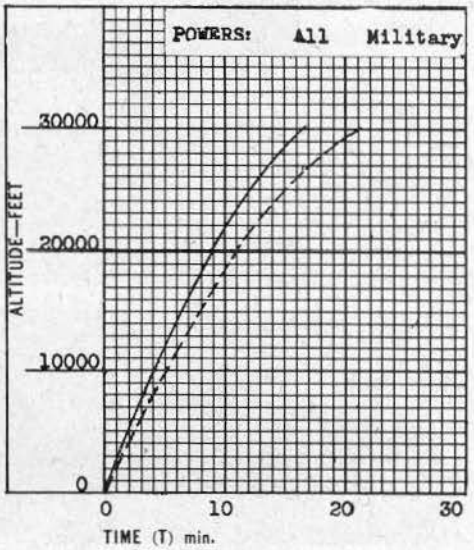

**SPEED VS. ALTITUDE**




**RATE OF CLIMB**




**TIME TO ALTITUDE**




**DATE** December 1944

**RESTRICTED**

# PERFORMANCE AND CHARACTERISTICS

# RUFE 11

## TAKE-OFF

| | Load | Feet |
|---|---|---|
| T.O. calm | | |
| T.O. 25 kt. wind | | |
| T.O. over 50' obstacle | | |
| Landing over 50' obstacle | | |

## CLIMB—CEILING

| @ 5420 lbs. | Feet | Min. |
|---|---|---|
| Rate @ S.L. | 2270 | 1 |
| Rate @ 13,800 ft. | 2485 | 1 |
| Time to 10,000' | | 4.3 |
| Time to 20,000' | | 8.7 |
| Service ceiling 33,600' | | |

## AIRCRAFT

Duty Fighter

Designation Type 2, Model 11

Description Low-wing Float Plane

Mfg. Nakajima

Engines 1 Crew 1

Construction All Metal

## SPEED

| @ 5420 lbs. | Mph. | Knts. | Altitude |
|---|---|---|---|
| Maximum | 228 | 197 | @ S. L. |
| Maximum | 273 | 237 | @ 14,700' |
| Cruising 75% | 166 | 144 | 1,500' |
| Economical | | | |

## BOMBS—CARGO

| | No. | Size | Total Lbs. |
|---|---|---|---|
| Normal | | | |
| Maximum | 2 | 60 kg. | 264 |

## ENGINES

| | H. P. | Altitude |
|---|---|---|
| Take-off | 925 | S.L. |
| Normal | 710<br>725 | S.L.<br>1,500' |
| Military | 820<br>935 | S.L.<br>13,800' |
| War Emerg. | | |

Mfg. Nakajima

Model Sakae 12

Type Radial

Cylinders 14 Cooling Air

Supercharger Single Speed

Propeller 3 Blade C.S. Diam. 9.4'

Fuel - Take-off 92 Cruising 92

## WEIGHTS

| | Lbs. |
|---|---|
| Empty | 3205 |
| Gross | 5420 |
| Overload | 6405 |

## FUEL

| | U.S. gal. | Imp. gal. |
|---|---|---|
| Built-in | 233 | 193 |
| Internal (Removable) | | |
| External (drop) | | |
| Maximum | 233 | 193 |

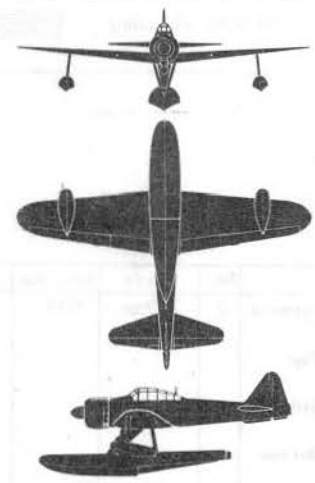
## RANGE AND RADIUS

| | Miles | | Speed | | Alt. feet | Fuel gal. | | Bombs lbs. | Cargo lbs. |
|---|---|---|---|---|---|---|---|---|---|
| | stat. | naut. | mph. | Knts. | | U. S. | Imp. | | |
| Maximum range | 1585 | 1290 | 124 | 107 | 1500 | 233 | 193 | None | None |
| (maximum fuel) At 75% Vmax. | 1290 | 1120 | 166 | 144 | 1500 | 233 | 193 | None | None |
| Maximum range (normal fuel) | 630 | 547 | 122 | 106 | 1500 | 87 | 72 | None | None |
| At 75% Vmax. | 500 | 434 | 166 | 144 | 1500 | 87 | 72 | None | None |
| Radius ( ) | | | | | | | | | |
| Radius ( ) | | | | | | | | | |

## DIMENSIONS

Span 39.3' Length 33.8'

Height Wing area 241 sq.ft.



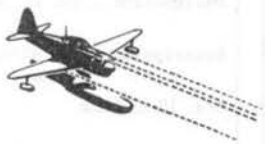
## GENERAL DATA

RUFE is a Navy Float plane used throughout all the Pacific Ocean theaters for fighter and observation duty. Except for changes in the tail, location of the oil cooler, and the addition of a fuel tank in the main float, RUFE is basically the same as ZEKE.

Performance is exceptionally good for a seaplane.

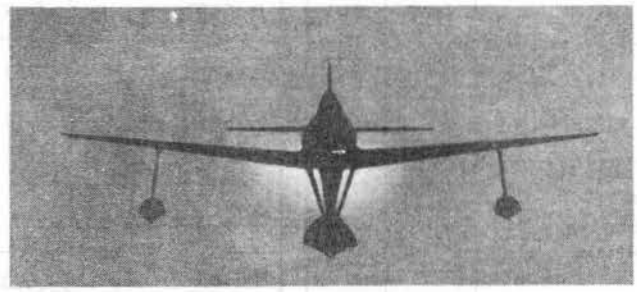
# RUFE 11

## FIELDS OF FIRE



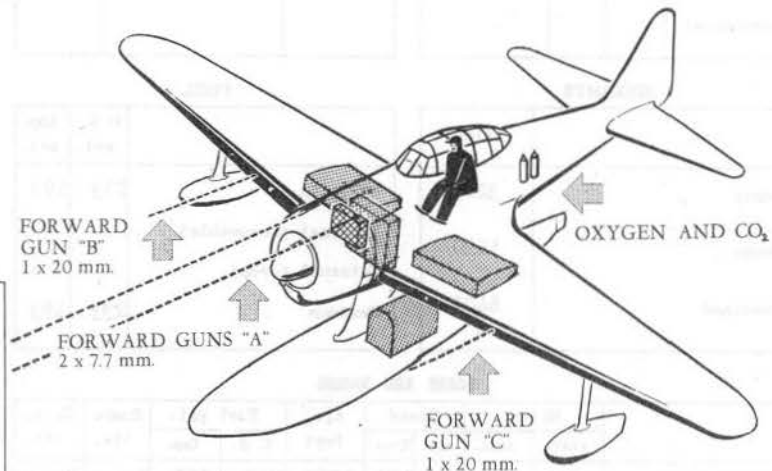
FORWARD GUNS "A", "B" AND "C"
¾-front view from above

## EXHAUST FLAME PATTERNS



REAR VIEW

## VULNERABILITY




LEGEND

- Fuel tanks, unprotected
- Fuel tanks, self-sealing
- Oil tanks, unprotected
- Oil tanks, self-sealing

### ARMAMENT

| | No. | Size | Rds. Gun | Type | | No. | Size | Rds. Gun | Type |
|---|---|---|---|---|---|---|---|---|---|
| Forward | 2 | 7.7mm | 500 | Fixed | Tail | | | | |
| Top | | | | | Wing | 2 | 20 mm | 60 | Fixed |
| Side | | | | | | | | | |
| Bottom | | | | | | | | | |

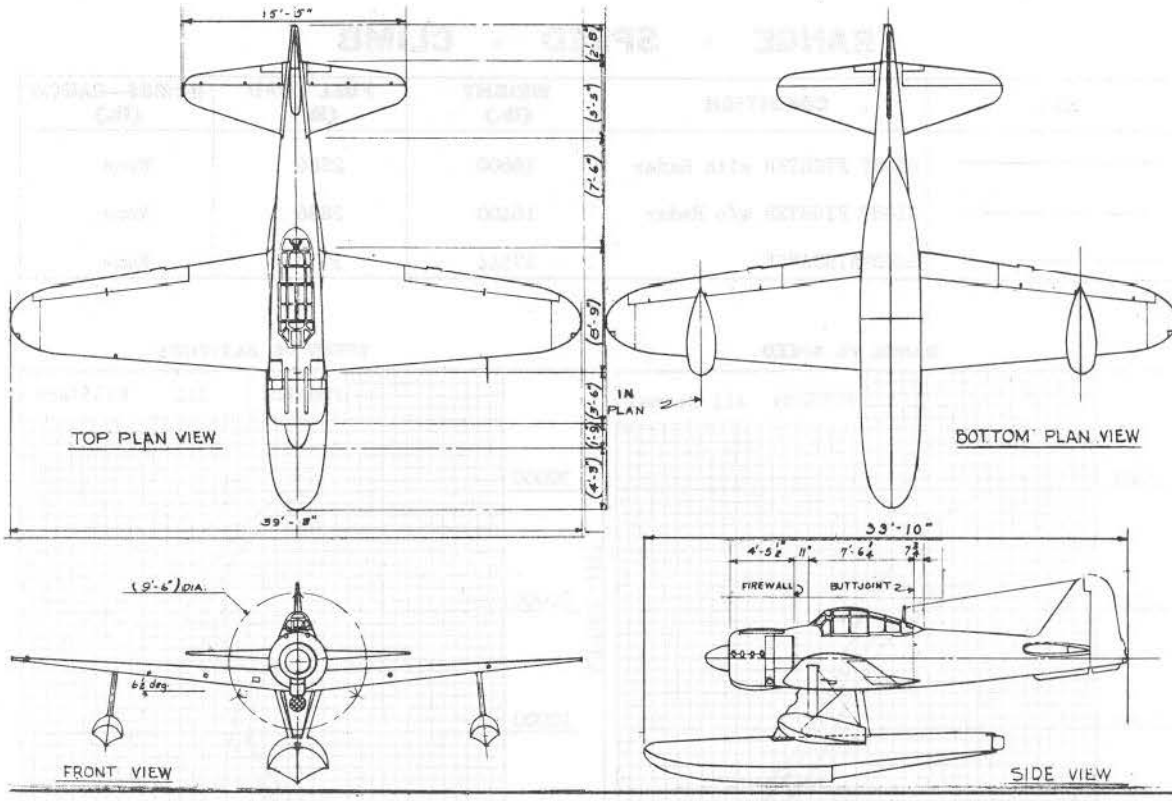
### TACTICAL DATA

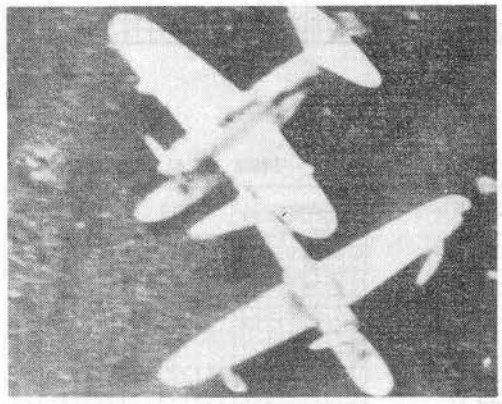
No protection is provided for the pilot or fuel tanks. There are two tanks in the wing roots and one in the main float. The float tank can be purged with $CO_2$.

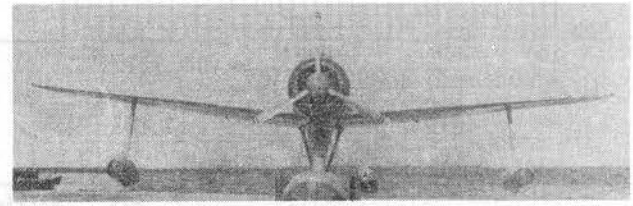
**DATE** December 1944

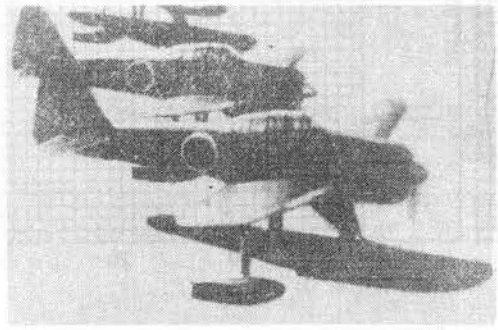
**RESTRICTED**

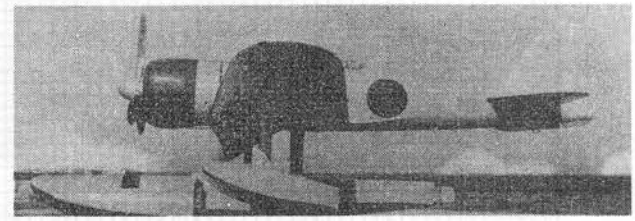
# RUFE 11

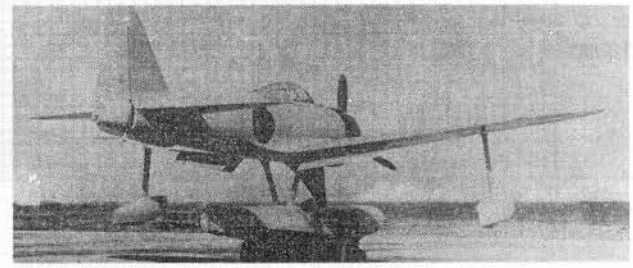

15'-5"
39'-8"
TOP PLAN VIEW
IN PLAN
BOTTOM PLAN VIEW
(9'-6") DIA.
6½ deg.
FRONT VIEW
33'-10"
4'-5½"
11"
7'-6½"
7¾
FIREWALL
BUTTJOINT 2
SIDE VIEW









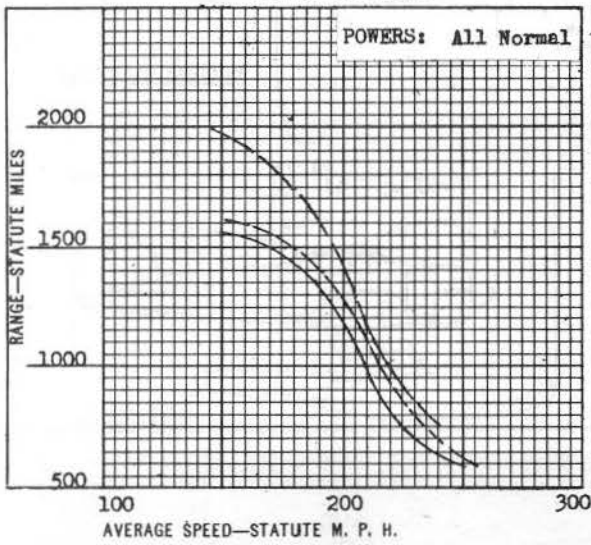


# IRVING 11

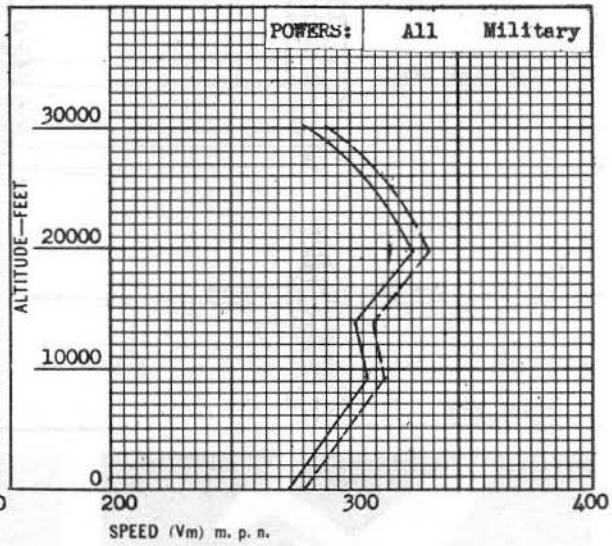
## RANGE • SPEED • CLIMB

| KEY | CONDITION | WEIGHT (lb.) | FUEL LOAD (lb.) | BOMBS—CARGO (lb.) |
|---|---|---|---|---|
| ——— | NIGHT FIGHTER with Radar | 16600 | 2886 | None |
| — — — — — | NIGHT FIGHTER w/o Radar | 16400 | 2886 | None |
| —— —— —— | RECONAISSANCE | 17544 | 3930 | None |

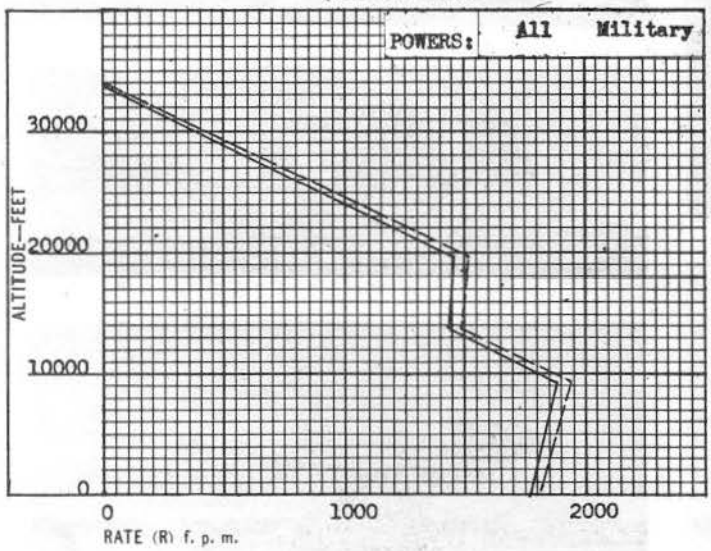
**RANGE VS. SPEED**



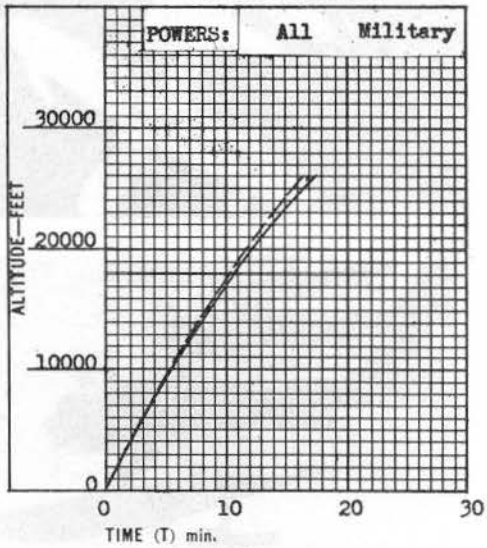

**SPEED VS. ALTITUDE**




**RATE OF CLIMB**




**TIME TO ALTITUDE**




**DATE** December 1944

**RESTRICTED**

# PERFORMANCE AND CHARACTERISTICS

# IRVING 11

## TAKE-OFF

| | Load | Feet |
|---|---|---|
| T. O. calm | 16600 | 1075 |
| T. O. 25 kt. wind | 16600 | 510 |
| T. O. over 50' obstacle | | |
| Landing over 50' obstacle | | |

## CLIMB—CEILING

| @ 16,600 lbs. | Feet | Min. |
|---|---|---|
| Rate @ S. L. | 1780 | 1 |
| Rate @ 9,350' | 1880 | 1 |
| Rate @ 19,700 ft. | 1460 | 1 |
| Time to 10,000' | | 5.5 |
| Time to 20,000' | | 12.1 |
| Service ceiling 32,740' | | |

## AIRCRAFT

Duty Night Fighter

Designation (GEKKO) Model 11

Description Low-wing Monoplane

Mfg. Nakajima

Engines 2 Crew 2

Construction All metal

## SPEED

| @ 16,600lbs. | Mph. | Knts. | Altitude |
|---|---|---|---|
| Maximum | 274 | 237 | @ S. L. |
| Maximum | 333 | 288 | @19,700' |
| Cruising 75% | 188 | 163 | 1,500' |
| Economical | | | |

## BOMBS—CARGO

| | No. | Size | Total Lbs. |
|---|---|---|---|
| Normal | | | |
| Maximum | 2 | 250kg | 1100 |

## ENGINES

| | H. P. | Altitude |
|---|---|---|
| Take-off | 1115 | S.L. |
| Normal | | |
| Military | 1085 | 9,350' |
| War Emerg. | 965<br>1180 | 19,700'<br>7,500' |

Mfg. Nakajima

Model Sakae 21

Type Radial

Cylinders 14 Cooling Air

Supercharger 2 Speed

Propeller 3 blade C.S. Diam. 10'

Fuel—Take-off 92 Cruising 92

## WEIGHTS

| | Lbs. |
|---|---|
| Empty | 10,700 |
| Gross (Night Fighter) | 16,600 |
| Overload (Reconnaissance) | 17,544 |

## FUEL

| | U.S. gal. | Imp. gal. |
|---|---|---|
| Built-in | 492 | 408 |
| Internal (Removable) | | |
| External (drop) | 174 | 144 |
| Maximum | 666 | 552 |

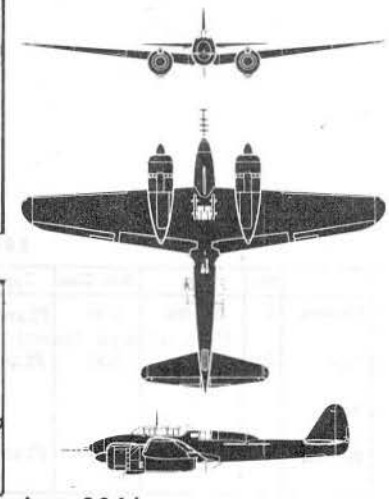
## RANGE AND RADIUS

| | Miles | | Speed | | Alt. feet | Fuel gal. | | Bombs lbs. | Cargo lbs. |
|---|---|---|---|---|---|---|---|---|---|
| | stat. | naut. | mph. | Knts. | | U. S. | Imp. | | |
| Maximum range (maximum fuel) | 1985 | 1725 | 145 | 126 | 1500 | 666 | 552 | None | None |
| @ 75% VM | 1745 | 1515 | 181 | 157 | 1500 | 666 | 552 | None | None |
| Maximum range (normal fuel) | 1560 | 1354 | 150 | 130 | 1500 | 492 | 408 | None | None |
| @ 75% VM | 1360 | 1080 | 188 | 163 | 1500 | 492 | 408 | None | None |
| Radius ( ) | | | | | | | | | |
| Radius ( ) | | | | | | | | | |

## DIMENSIONS

Span 55.7' Length 39.9'

Height 15' Wing area 430 sq.ft.



## GENERAL DATA

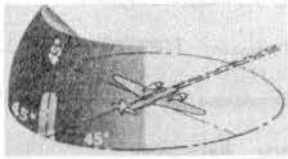
IRVING carries radar and may be used either as a night fighter or for reconnaissance. Except for "Maximum Range with Maximum Fuel", the above figures are based on the night fighter version.

Auxiliary fuel tanks are known to be carried but the 2 x 87 gallon tanks are assumptions.

Internal fuel and lube oil tanks are self-sealing.

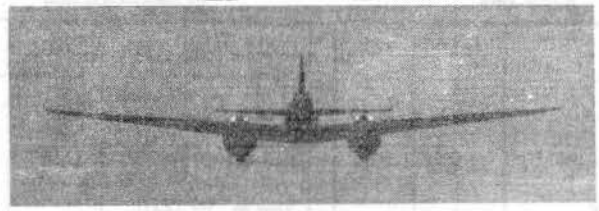
# IRVING 11

## FIELDS OF FIRE



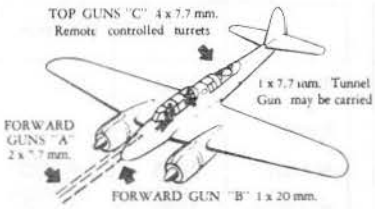
FORWARD GUNS "A", AND "B" AND TOP GUN "C"
¾-rear view from above
Reconnaissance Version

## EXHAUST FLAME PATTERNS



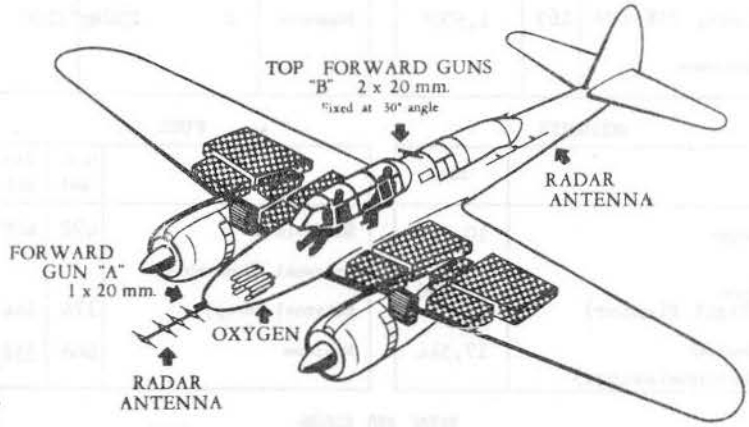
REAR VIEW

## VULNERABILITY




Reconnaissance Version
¾-front view from above

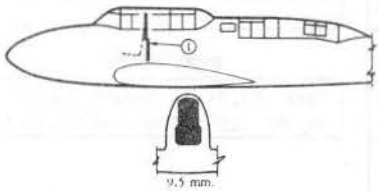
Fuel and Oil tanks and oxygen cylinders are same on both versions




NOTE:
Alternate nose carries landing light in place of gun and radar antenna

Night Fighter Version

## ARMOR PLATE




Viewed from rear

LEGEND

| | | | |
|---|---|---|---|
| Fuel tanks, unprotected | | Oil tanks, unprotected | |
| Fuel tanks, protected | | Oil tanks, protected | |

## ARMAMENT

| | No. | Size | Rds. Gun | Type | | No. | Size | Rds. Gun | Type |
|---|---|---|---|---|---|---|---|---|---|
| Forward | 1 | 20 mm (Not always found) | 100 | Fixed | Tail | | | | |
| Top | 2 | 20 mm | 100 | Fixed | Wing | | | | |
| Side | | | | | | | | | |
| Bottom | 2 | 20 mm | 100 | Fixed | | | | | |

## TACTICAL DATA

The top and bottom 20 mm guns are mounted to face forward at a fixed angle of 30° from the longitudinal axis of the fuselage.

Armor plate is installed to protect the pilot's back and head.

Armament has varied considerably in recce versions.

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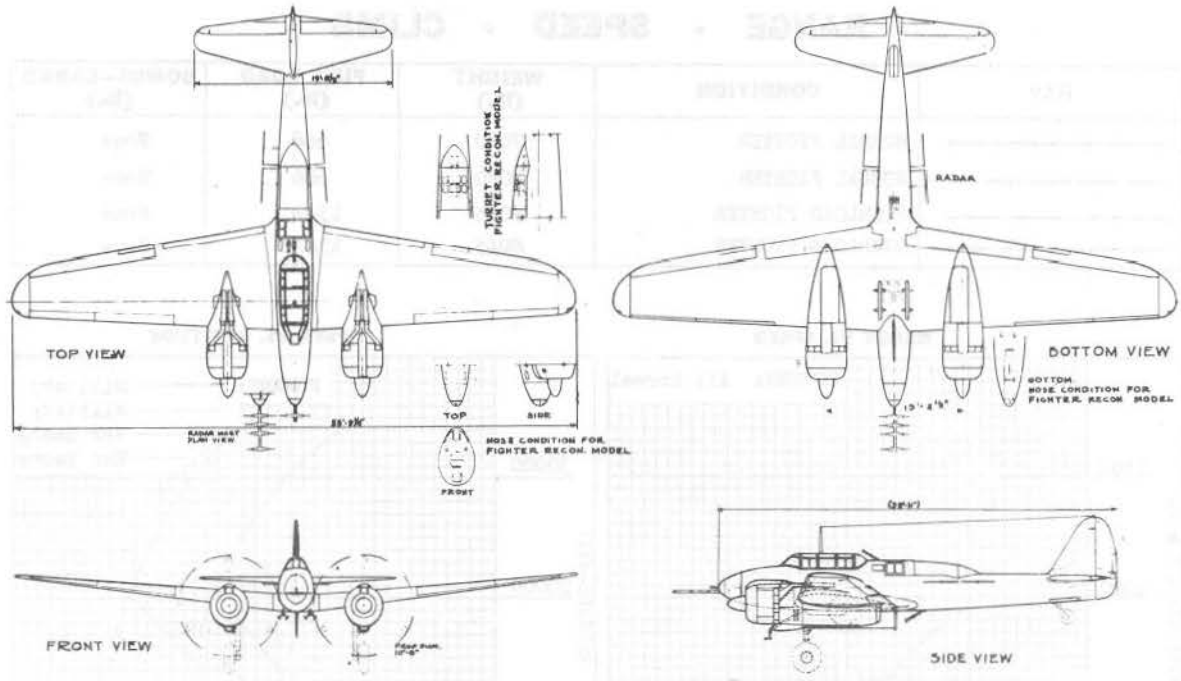
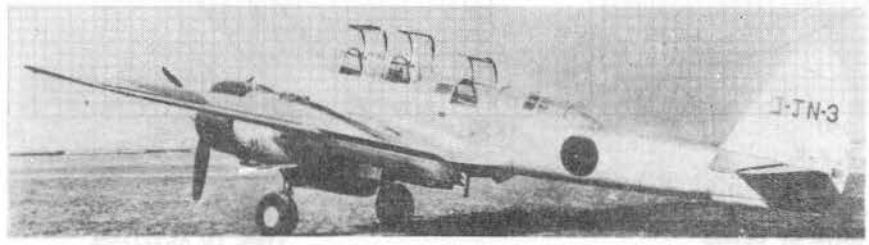
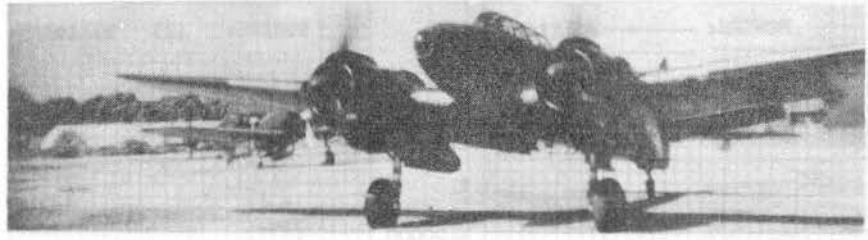
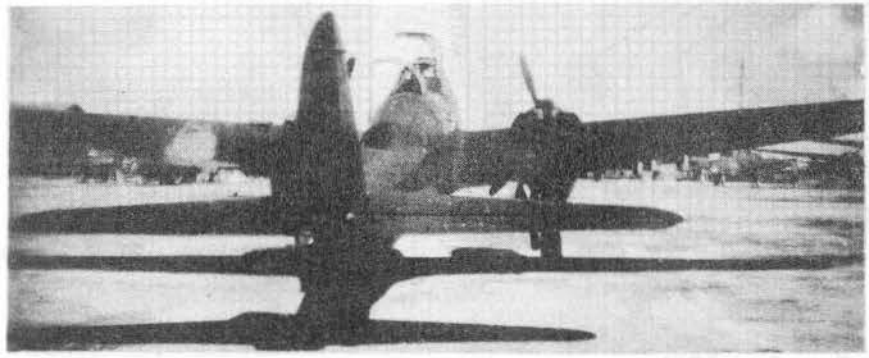
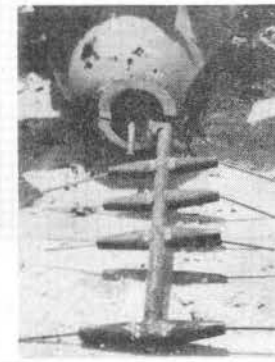
# IRVING 11









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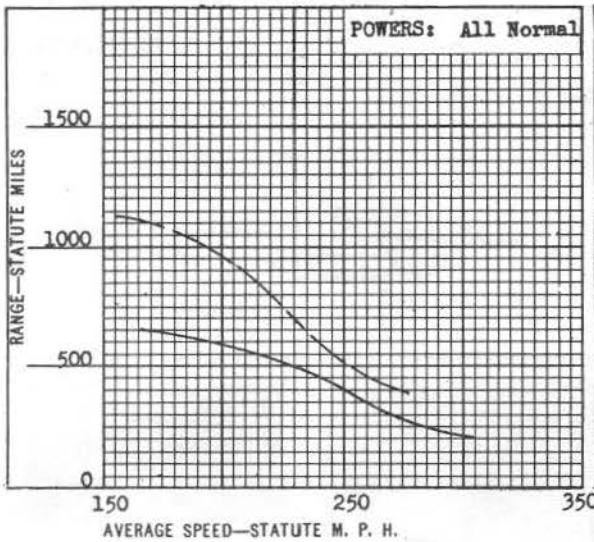
# JACK 11

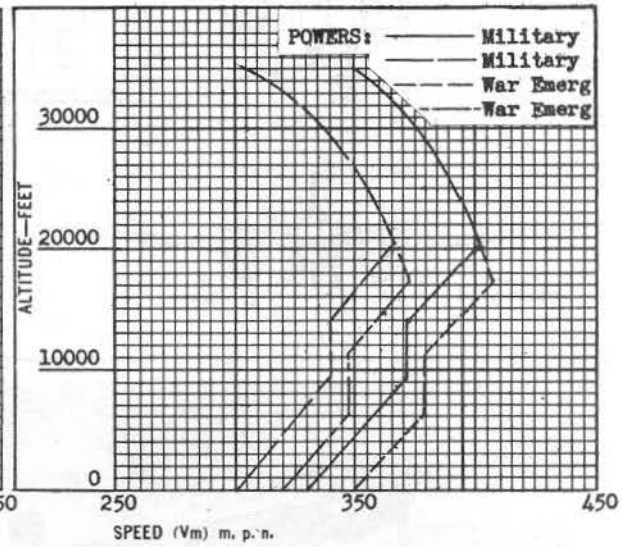
## RANGE * SPEED * CLIMB

| KEY | CONDITION | WEIGHT (lb.) | FUEL LOAD (lb.) | BOMBS—CARGO (lb.) |
|---|---|---|---|---|
| ——— | NORMAL FIGHTER | 7080 | 666 | None |
| — — — — | NORMAL FIGHTER | 7080 | 666 | None |
| ——— | OVERLOAD FIGHTER | 8045 | 1347 | None |
| ——— | OVERLOAD FIGHTER | 8045 | 1347 | None |

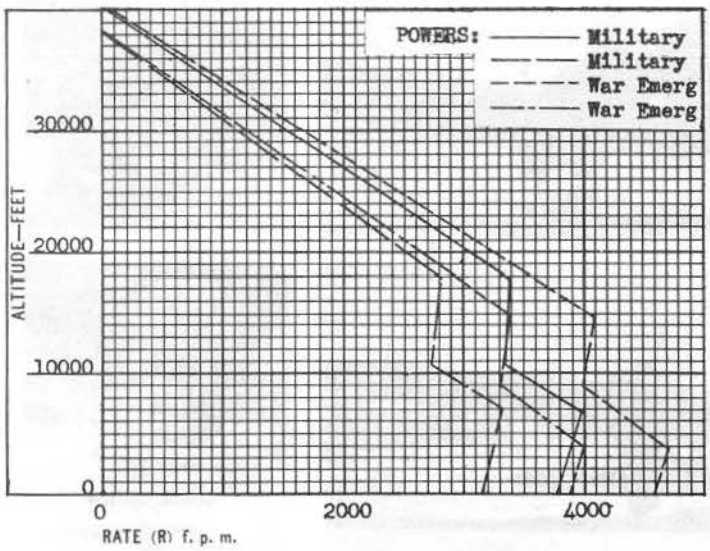
RANGE VS. SPEED



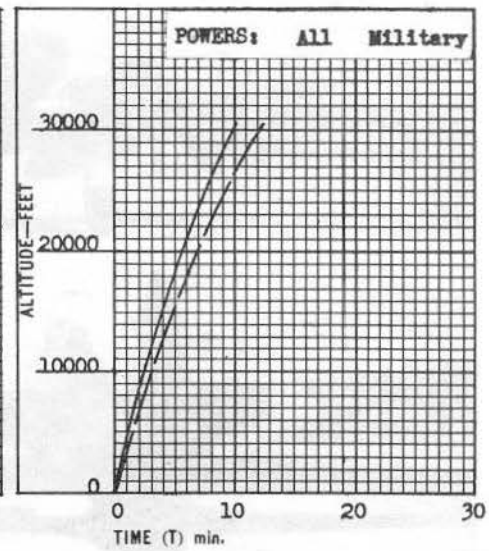

SPEED VS. ALTITUDE




RATE OF CLIMB




TIME TO ALTITUDE

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# PERFORMANCE AND CHARACTERISTICS

# JACK 11

### TAKE-OFF

| | Load | Feet |
|---|---|---|
| T. O. calm | 7080 | 585 |
| T. O. 25 kt. wind | 7080 | 261 |
| T. O. over 50' obstacle | | |
| Landing over 50' obstacle | | |

### CLIMB—CEILING

| @ 7080 lbs. | Feet | Min. |
|---|---|---|
| Rate @ S. L. | 4600 | 1 |
| Rate @ 14,800 ft. | 4080 | 1 |
| Time to 10,000' | | 2.6 |
| Time to 20'000' | | 5.6 |
| Service ceiling 37,500' | | |

### AIRCRAFT

Duty Fighter

Designation (RAIDEN) Model 11

Description Low-wing Monoplane

Mfg. Mitsubishi

Engines 1 Crew 1

Construction All metal

### SPEED

| @ 7080 lbs. | Mph. | Knts. | Altitude |
|---|---|---|---|
| Maximum | 350 | 304 | @ S. L. |
| Maximum | 407 | 355 | @ 17,400' |
| Cruising 75% | 228 | 197 | 1,500' |
| Economical | | | |

### BOMBS—CARGO

| | No. Size | Total Lbs. |
|---|---|---|
| Normal | None | |
| Maximum | 2 x 35 kg. | 154 |

### ENGINES

| | H. P. | Altitude |
|---|---|---|
| Take-off | 1870 | S.L. |
| Normal | 1370 | 9,850' |
| Military | 1580<br>1560 | S.L.<br>17,900' |
| War Emerg. | 1940 | 4,400' |

Mfg. Mitsubishi

Model KASEI 23

Type Radial

Cylinders 14 Cooling Air

Supercharger 2 Speed

Propeller 4 blade C.S. Diam. 10.8'

Fuel—Take-off 92 Cruising 92 plus methanol

### WEIGHTS

| | Lbs. |
|---|---|
| Empty | 5178 |
| Gross | 7080 |
| Overload | 8045 |

### FUEL

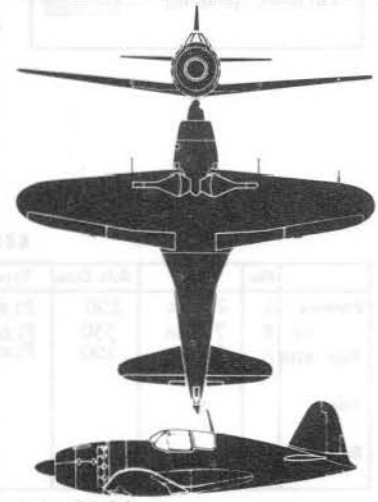
| | U.S. gal. | Imp. gal. |
|---|---|---|
| Built-in | 109 | 90 |
| Internal (Removable) | 48 | 40 |
| External (drop) | 66 | 55 |
| Maximum | 223 | 185 |

### RANGE AND RADIUS

| | Miles | | Speed | | Alt. | Fuel gal. | | Bombs | Cargo |
|---|---|---|---|---|---|---|---|---|---|
| | stat. | naut. | mph. | Knts. | feet | U. S. | Imp. | lbs. | lbs. |
| Maximum range (maximum fuel) At 75% Vmax. | 1127 | 968 | 156 | 135 | 1500 | 223 | 185 | 154 | None |
| | 912 | 795 | 208 | 180 | 1500 | 223 | 185 | 154 | None |
| Maximum range (normal fuel) At 75% Vmax. | 650 | 564 | 165 | 143 | 1500 | 109 | 90 | None | None |
| | 508 | 440 | 228 | 197 | 1500 | 109 | 90 | None | None |
| Radius ( ) | | | | | | | | | |
| Radius ( ) | | | | | | | | | |

### DIMENSIONS

Span 35.4' Length 31.8'
Height 12.9' Wing area 216 sq. ft.



### GENERAL DATA

JACK is cleanly designed. The fact that it has a short range and high rate of climb indicates that it will be used as an interceptor fighter. It can carry a small bomb under each wing which will probably be employed for air to air attack against bomber formations.

Wing fuel tanks are not used under Gross Load. A jettisonable belly tank and 2 x 35 kg external bombs are allowed for under "Maximum Range".

**RESTRICTED** **DATE** December 1944

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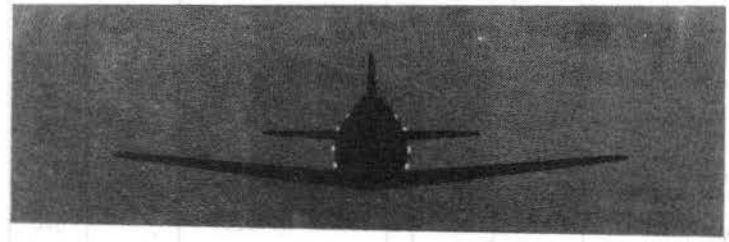
# JACK 11

## FIELDS OF FIRE

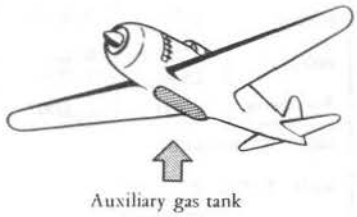
FORWARD GUNS
"A", AND "B"
¾-front view from above

## EXHAUST FLAME PATTERNS

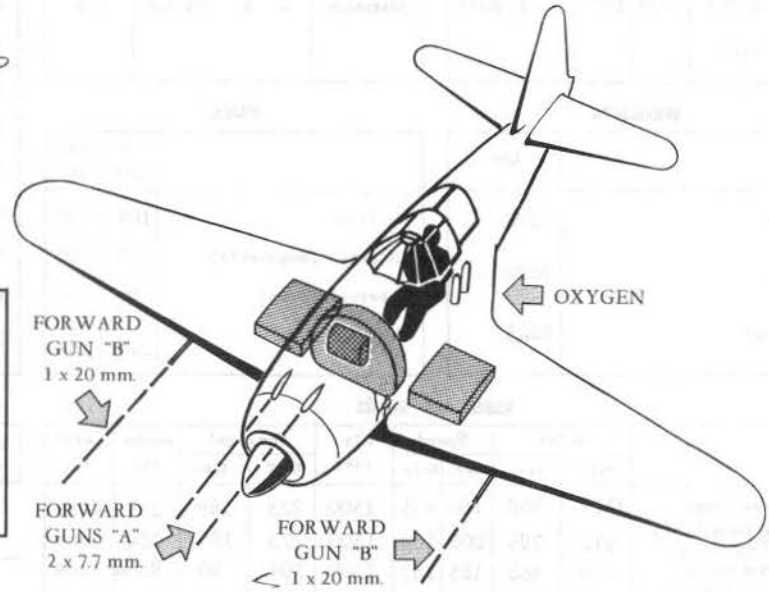


REAR VIEW

## VULNERABILITY



Auxiliary gas tank
Jettisonable




LEGEND
- Fuel tanks, unprotected
- Fuel tanks, protected
- Oil tanks, unprotected
- Oil tanks, protected

### ARMAMENT

| | No. | Size | Rds. Gun. | Type | | No. | Size | Rds. Gun | Type |
|---|---|---|---|---|---|---|---|---|---|
| Forward | 4 | 20 mm | 100 | Fixed | Tail | | | | |
| or | 2 | 7.7mm | 550 | Fixed | | | | | |
| Top and | 2 | 20 mm | 100 | Fixed | Wing | | | | |
| Side | | | | | | | | | |
| Bottom | | | | | | | | | |

### TACTICAL DATA

JACK is more powerful and heavily armed than previous Japanese fighters. Probably less maneuverable than ZEKE but superior in diving and climbing at high speeds.

No armor or fuel protection have been indicated.

**DATE** December 1944

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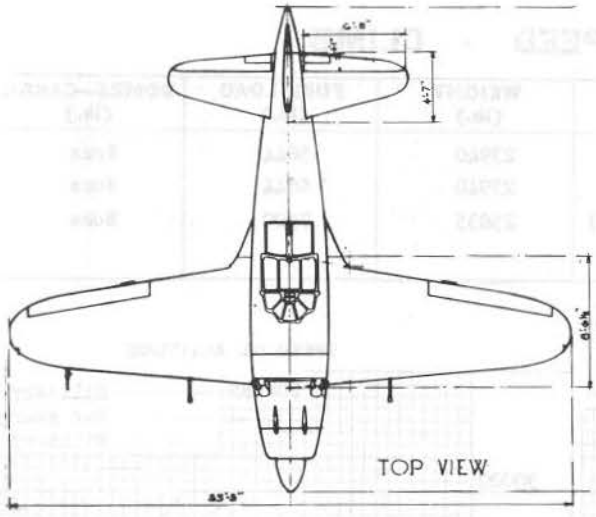
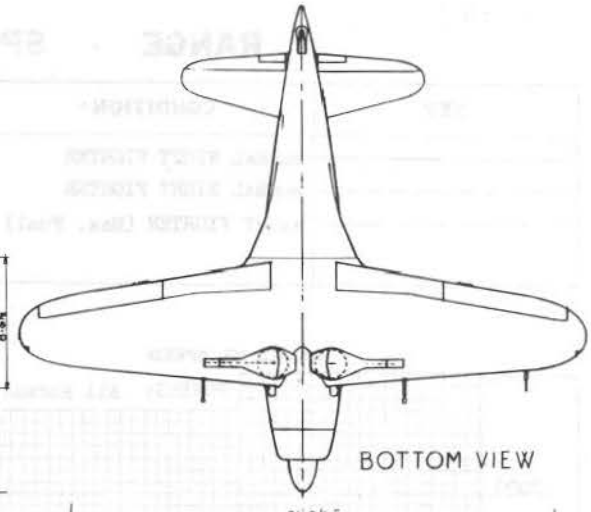
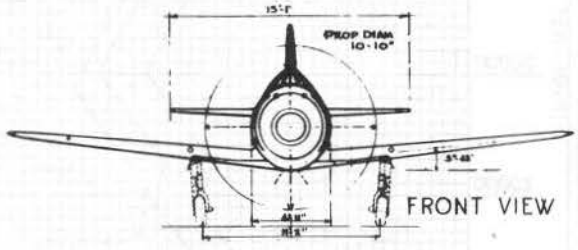
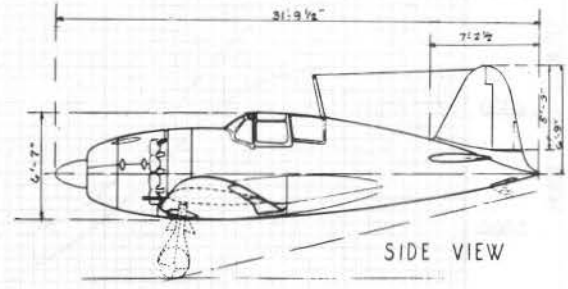
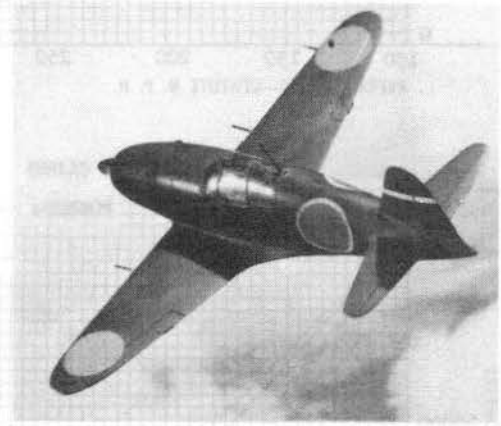
# JACK 11

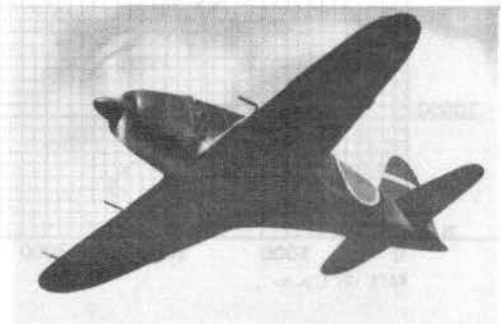






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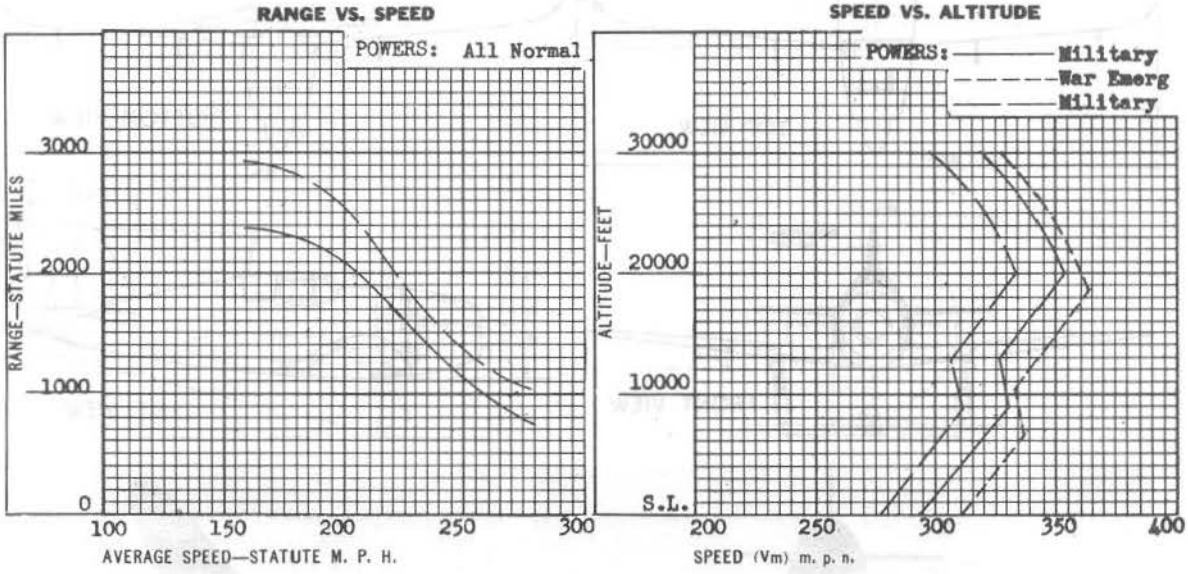
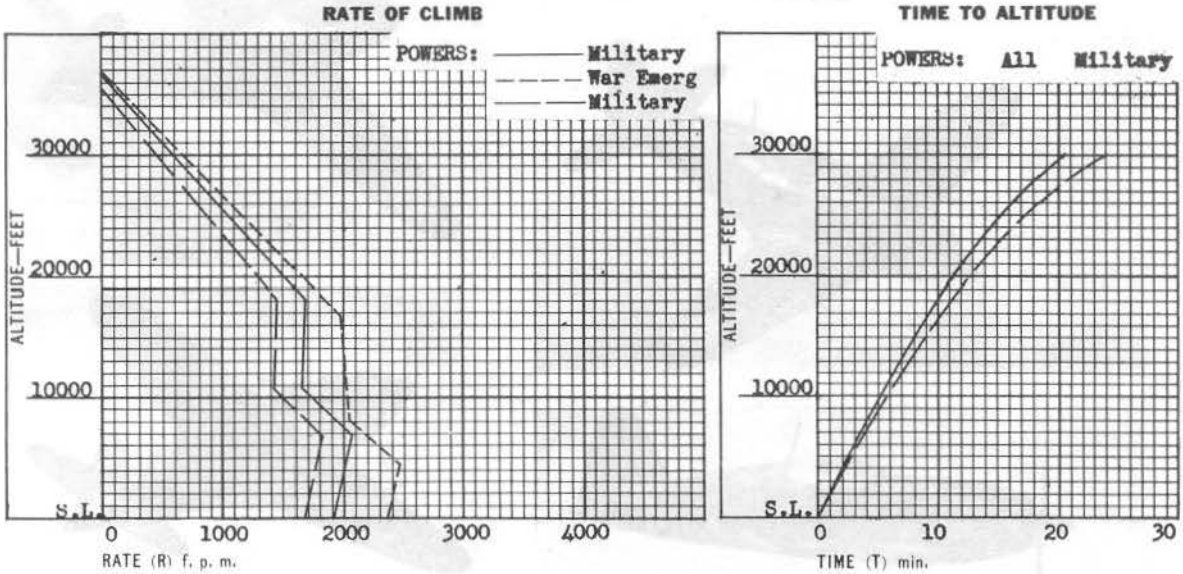
# FRANCES 12( ? )

## RANGE * SPEED * CLIMB

| KEY | CONDITION | WEIGHT (lb.) | FUEL LOAD (lb.) | BOMBS—CARGO (lb.) |
|---|---|---|---|---|
| ——— | NORMAL NIGHT FIGHTER | 23940 | 5844 | None |
| - - - - - - - - - - - | NORMAL NIGHT FIGHTER | 23940 | 5844 | None |
| ——— — ——— — | NIGHT FIGHTER (Max. Fuel) | 25835 | 7500 | None |




**DATE** December 1944

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# PERFORMANCE AND CHARACTERISTICS FRANCES 12 ( ? )

## TAKE-OFF

| | Load | Feet |
|---|---|---|
| T.O. calm | 23,940 | 887 |
| T.O. 25 kt. wind | 23,940 | 422 |
| T.O. over 50' obstacle | | |
| Landing over 50' obstacle | | |

## CLIMB—CEILING

| @ 23,940 lbs. | Feet | Min. |
|---|---|---|
| Rate @ S.L. | 1910 | 1 |
| Rate @ 6900 ft. | 2065 | 1 |
| Time to 10,000' | | 5.1 |
| Time to 20,000' | | 11.2 |
| Service ceiling 35,600' | | |

## AIRCRAFT

Duty Night Fighter

Designation (HAKKŌ) Model 12

Description Mid-wing Monoplane

Mfg. Nakajima

Engines 2 Crew 3

Construction All Metal

## SPEED

| @ 23,940lbs. | Mph. | Knts. | Altitude |
|---|---|---|---|
| Maximum | 293 | 254 | @ S. L. |
| Maximum | 354 | 307 | @ 20,050' |
| Cruising 75% | 207 | 180 | 1,500' |
| Economical | | | |

## BOMBS—CARGO

| | No. Size | Total Lbs. |
|---|---|---|
| Normal | None | |
| Maximum | None | |

## ENGINES

| | H. P. | Altitude |
|---|---|---|
| Take-off | 1885 | S.L. |
| Normal | | |
| Military | 1655<br>1520 | 6,900'<br>18,050' |
| War Emerg. | 1735 | 16,800' |

Mfg. Mitsubishi

Model KASEI 25

Type Radial

Cylinders 14 Cooling Air

Supercharger 2 Speed

Propeller 4 Blade C.S. Diam. 11.2'

Fuel - Take-off 92 Cruising 92 plus methanol

## WEIGHTS

| | Lbs. |
|---|---|
| Empty | 17950 |
| Gross | 23940 |
| Overload | 25835 |

## FUEL

| | U.S. gal. | Imp. gal. |
|---|---|---|
| Built-in | 998 | 828 |
| Internal (Removable) | | |
| External (drop) | 276 | 229 |
| Maximum | *1274 | 1057 |

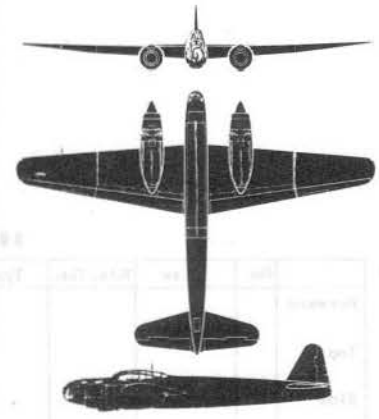
## RANGE AND RADIUS

| | Miles | | Speed | | Alt. | Fuel gal. | | Bombs | Cargo |
|---|---|---|---|---|---|---|---|---|---|
| | stat. | naut. | mph. | Knts. | feet | U. S. | Imp. | lbs. | lbs. |
| Maximum range (maximum fuel) | 2925 | 2540 | 159 | 137 | 1500 | 1274 | 1057 | None | None |
| At 75% Vmax. | 2465 | 2140 | 205 | 178 | 1500 | 1274 | 1057 | None | None |
| Maximum range (normal fuel) | 2385 | 2071 | 159 | 137 | 1500 | 998 | 828 | None | None |
| At 75% Vmax. | 1980 | 1464 | 207 | 180 | 1500 | 998 | 828 | None | None |
| Radius ( ) | | | | | | | | | |
| Radius ( ) | | | | | | | | | |

## DIMENSIONS

Span 65.6' Length 49.2'

Height 17.4' Wing area 592 sq.ft.



## GENERAL DATA

Except for engines and armament no substantial difference is noted between the bomber and night fighter versions of FRANCES. Radar is undoubtedly carried in the night fighter.

*The fuselage tank of 306 gallons carried in FRANCES 11 has been eliminated in the calculations for FRANCES 12 (?) to allow room for additional night fighter equipment.

Silhouette shown is FRANCES 11.

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# FRANCES 12 ( ? )

Vulnerability, Fields of Fire, etc.

**ARMAMENT**

| | No. | Size | Rds. Gun | Type | | No. | Size | Rds. Gun | Type |
|---|---|---|---|---|---|---|---|---|---|
| Forward | | | | | Tail | | | | |
| Top | | | | | Wing | | | | |
| Side | | | | | | 4 | 20 mm | 100 | ? |
| Bottom | | | | | | 1 | 30 mm | 42 | ? |

**TACTICAL DATA**

Armor is provided for the pilot's back and head with a telescoping head piece.

Heavy armament is reported in the night fighter version but the location is unknown.

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# FRANCES 12( ? )

Drawing

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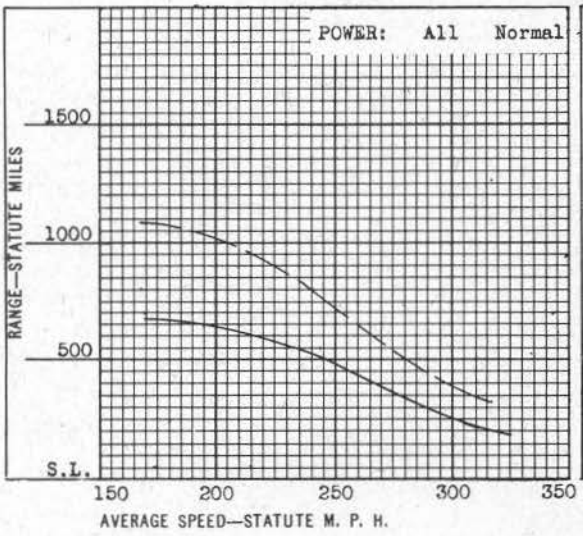
Photos

# GEORGE 11

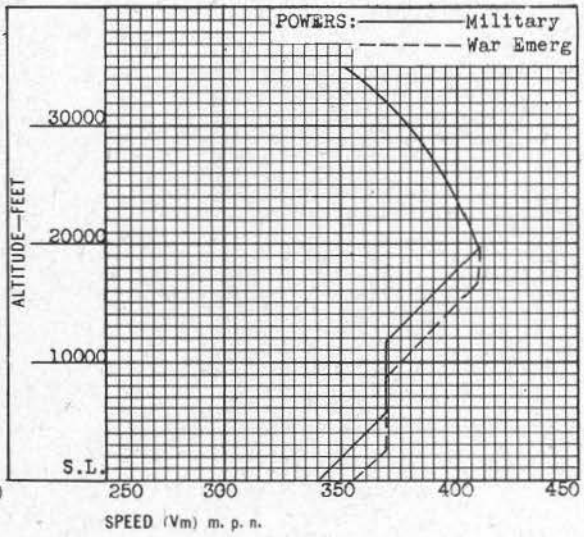
## RANGE * SPEED * CLIMB

| KEY | CONDITION | WEIGHT (lb.) | FUEL LOAD (lb.) | BOMBS—CARGO (lb.) |
|---|---|---|---|---|
| ——— | FIGHTER | 7717 | 750 | None |
| – – – – – – – – | FIGHTER | 7717 | 750 | None |
| —— —— —— —— | FIGHTER EXT. FUEL | 8390 | 1272 | None |

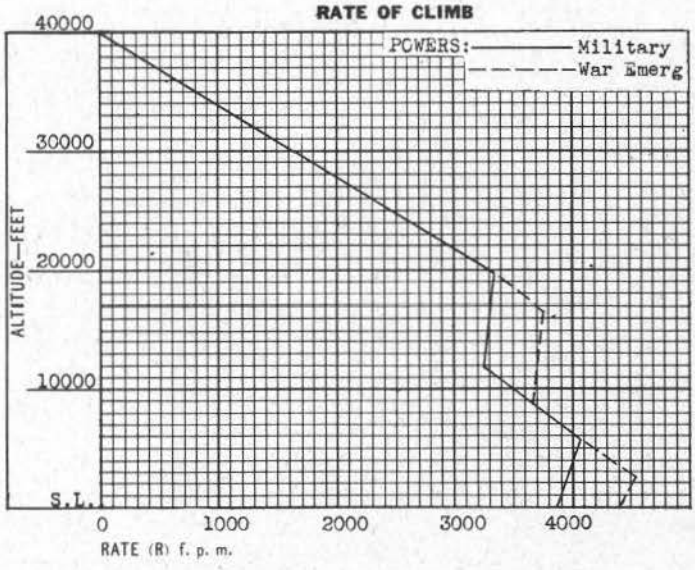
**RANGE VS. SPEED**



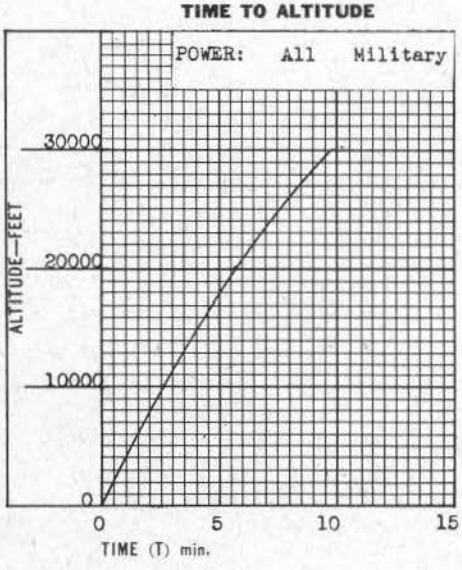

**SPEED VS. ALTITUDE**




**RATE OF CLIMB**




**TIME TO ALTITUDE**




**DATE** March 1945

**RESTRICTED**

# PERFORMANCE AND CHARACTERISTICS

# GEORGE 11

## TAKE-OFF

| | Load | Feet |
|---|---|---|
| **Runway Requirements** | 7717 | 1430 |
| T.O. over 50' obstacle | | |
| Landing over 50' obstacle | | |
| *T.O. + 100% | | |

## CLIMB—CEILING

| @ 7717 lbs. | Feet | Min. |
|---|---|---|
| Rate @ S.L. | 3875 | 1 |
| Rate @ 5900 ft. | 4065 | 1 |
| Time to 10,000' | | 2.6 |
| Time to 20,000' | | 5.6 |
| Service ceiling 39,400' | | |

## AIRCRAFT

Duty Fighter

Designation Shiden (Model 11) N1K1-J

Description Low-mid-wing Monoplane

Mfg. Kawanishi

Engines 1 Crew 1

Construction All Metal

## SPEED

| @ 7717 lbs. | Mph. | Knts. | Altitude |
|---|---|---|---|
| Maximum | 355 | 308 | @ S. L. |
| Maximum | 408 | 353 | @ 20,000' |
| Cruising | | | |
| Economical | | | |

## BOMBS—CARGO

| | No. | Size | Total Lbs. |
|---|---|---|---|
| Normal | | | None |
| Maximum | | | |

## ENGINES

| | H. P. | Altitude |
|---|---|---|
| Take-off | 1975 | S.L. |
| Normal | 1640 | 7100' |
| Military | 1875 | 5900' |
| | 1675 | 19620 |
| War Emerg. | 2050 | 2500' |

Mfg. Nakajima

Model Homare 21

Type Radial

Cylinders 18 Cooling Air

Supercharger 2 Speed

Propeller 4 Blade Diam. 9.8' CSVP

Fuel - Take-off 92 Cruising 92 Plus methanol

## WEIGHTS

| | Lbs. |
|---|---|
| Empty | 5962 |
| Gross | 7717 |
| Overload | 8390 |

## FUEL

| | U.S. gal. | Imp. gal. |
|---|---|---|
| Built-in | 125 | 105 |
| Internal (Removable) | | |
| External (drop) | 87 | 71 |
| Maximum | 212 | 176 |

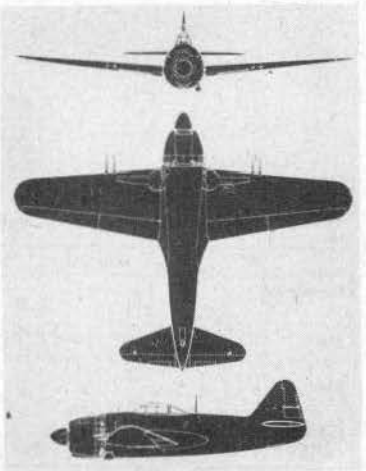
## RANGE AND RADIUS

| | Miles | | Speed | | Alt. feet | Fuel gal. | | Bombs lbs. | Cargo lbs. |
|---|---|---|---|---|---|---|---|---|---|
| | stat. | naut. | mph. | Knts. | | U. S. | Imp. | | |
| Maximum range (maximum fuel) | 1085 | 941 | 167 | 143 | 1500 | 212 | 176 | None | None |
| At 75% Vmax. | 830 | 720 | 237 | 205 | 1500 | 212 | 176 | None | None |
| Maximum range (normal fuel) | 670 | 580 | 169 | 147 | 1500 | 125 | 105 | None | None |
| At 75% Vmax. | 505 | 438 | 243 | 211 | 1500 | 125 | 105 | None | None |
| Radius ( ) | | | | | | | | | |
| Radius ( ) | | | | | | | | | |

## DIMENSIONS

Span 39.4' Length 28'

Height 13.3' Wing area 253 sq.ft.



## GENERAL DATA

A new performance sheet will be issued shortly on GEORGE. Recent findings have made some variations in the above figures.

107A-3

# GEORGE 11

Vulnerability, Fields of Fire, etc.

**ARMAMENT**

| | No. | Size | Rds. Gun | Type | | No. | Size | Rds. Gun | Type |
|---|---|---|---|---|---|---|---|---|---|
| Forward | | | | | Tail | | | | |
| Top | | | | | Wing | | | | |
| Side | | | | | | | | | |
| Bottom | | | | | | | | | |

**TACTICAL DATA**

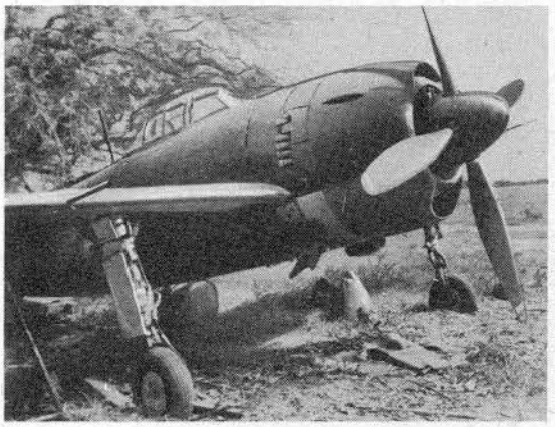
**DATE** March 1945

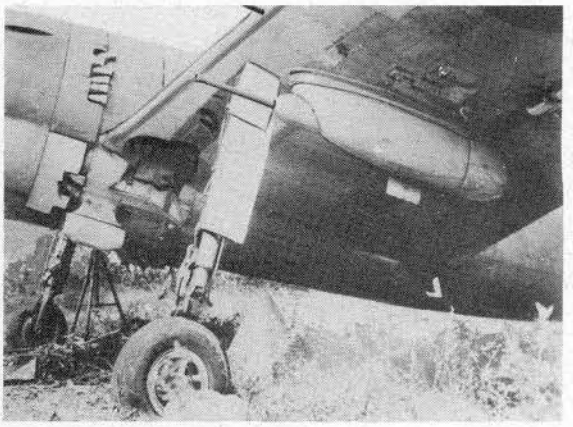
**RESTRICTED**

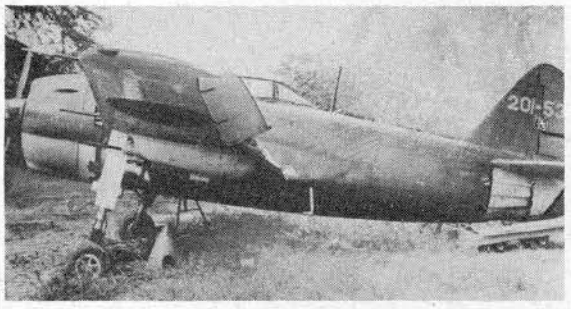
107A-4

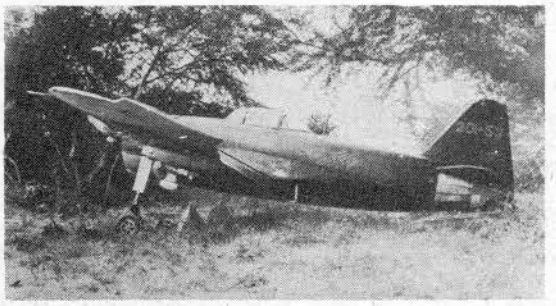
# GEORGE 11

Drawing











**DATE** March 1945

# SAM 11

Vulnerability, Fields of Fire, etc.

**ARMAMENT**

| | No. | Size | Rds. Gun | Type | | No. | Size | Rds. Gun | Type |
|---|---|---|---|---|---|---|---|---|---|
| Forward | 2 | 20 mm | 120 | Fixed | Tail | | | | |
| | 2 | 13 mm | 300 | Fixed | | | | | |
| Top | | | | | Wing | | | | |
| Side | | | | | | | | | |
| Bottom | | | | | | | | | |

**TACTICAL DATA**

No information

**DATE** December 1944

**RESTRICTED**

# PERFORMANCE AND CHARACTERISTICS

# SAM 11

## TAKE-OFF

| | Load | Feet |
|---|---|---|
| T.O. calm | | |
| T.O. 25 kt. wind | | |
| T.O. over 50' obstacle | | |
| Landing over 50' obstacle | | |

## CLIMB—CEILING

| @ lbs. | Feet | Min. |
|---|---|---|
| Rate @ S.L. | | |
| Rate @ ft. | | |
| Time to 19,686' | | 6 |
| Time to | | |
| Service ceiling 40,000' | | |

## AIRCRAFT

Duty Fighter, Carrier-borne

Designation (REPPŪ) Model 11

Description

Mfg. Mitsubishi

Engines 1 Crew 1

Construction All Metal (?)

## SPEED

| @ lbs. | Mph. | Knts. | Altitude |
|---|---|---|---|
| Maximum | | | @ S. L. |
| Maximum | 395 | 343 | @19,686' |
| Cruising 75% | 288 | 250 | 1,500' |
| Economical | | | |

## BOMBS—CARGO

| | No. | Size | Total Lbs. |
|---|---|---|---|
| Normal | 2 | 60 kg | 264 |
| Maximum | | | |

## ENGINES

| | H. P. | Altitude |
|---|---|---|
| Take-off | 1790 | S.L. |
| Normal | | |
| Military | 1900 | 6,560' |
| War Emerg. | 1700 | 19,686' |

Mfg. Nakajima

Model Homare 41

Type Radial

Cylinders 18 Cooling Air

Supercharger 2 Stage

Propeller 4 Blade Diam.

Fuel - Take-off C.S. Cruising

## WEIGHTS

| | Lbs. |
|---|---|
| Empty | 5645 |
| Gross | 8380 |
| Overload | 9260 |

## FUEL

| | U.S. gal. | Imp. gal. |
|---|---|---|
| Built-in | 265 | |
| Internal (Removable) | | |
| External (drop) | 132 | |
| Maximum | 397 | |

## RANGE AND RADIUS

| | Miles | | Speed | | Alt. feet | Fuel gal. | | Bombs lbs. | Cargo lbs. |
|---|---|---|---|---|---|---|---|---|---|
| | stat. | naut. | mph. | Knts. | | U. S. | Imp. | | |
| Maximum range (maximum fuel) | 1440 | 1250 | | | | 397 | | None | None |
| Maximum range (normal fuel) | | | | | | | | | |
| Radius ( ) | | | | | | | | | |
| Radius ( ) | | | | | | | | | |

## DIMENSIONS

Span 36.1' Length 29.5'

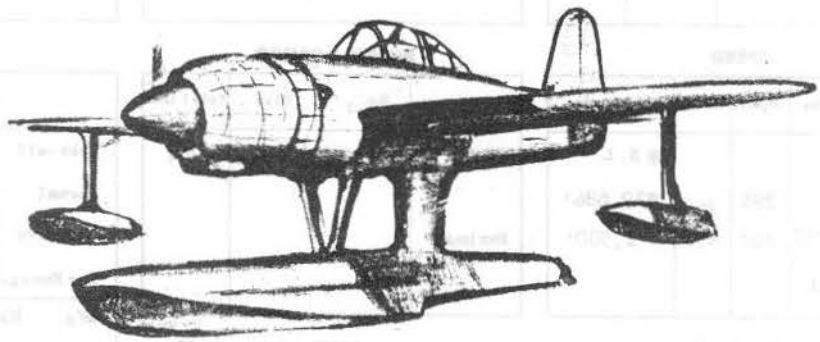
Height Wing area sq.ft.

## GENERAL DATA

SAM 11, 17 Experimental Carrier-borne fighter, is a relatively long range, general purpose carrier fighter apparently designed as the successor to the ZEKE models.

Little is known of SAM, and performance, therefore, is necessarily incomplete.

# REX 11



Provisional Sketch

**ARMAMENT**

| | No. | Size | Rds. Gun | Type | | No. | Size | Rds. Gun | Type |
|---|---|---|---|---|---|---|---|---|---|
| Forward | 2 | 7.7 mm | | Fixed | Tail | | | | |
| Top | | | | | Wing | 2 | 20 mm | | Fixed |
| Side | | | | | or | 4 | 7.7mm | | Fixed |
| Bottom | | | | | | | | | |

**TACTICAL DATA**

No information available.

**DATE** December 1944

**RESTRICTED**

# PERFORMANCE AND CHARACTERISTICS

# REX 11

## TAKE-OFF

| | Load | Feet |
|---|---|---|
| T.O. calm | | |
| T.O. 25 kt. wind | | |
| T.O. over 50' obstacle | | |
| Landing over 50' obstacle | | |

## CLIMB—CEILING

| @ lbs. | Feet | Min. |
|---|---|---|
| Rate @ S.L. | | |
| Rate @ ft. | | |
| Time to 19,680' | | 6.3 |
| Time to | | |
| Service ceiling | | |

## AIRCRAFT

Duty Fighter

Designation (KYOFU) Model 11

Description Mid-wing Float Plane

Mfg. Kawanishi

Engines 1 Crew 1

Construction All Metal

## SPEED

| @ lbs. | Mph. | Knts. | Altitude |
|---|---|---|---|
| Maximum | | | @ S. L. |
| Maximum | 336 | 292 | @ 18,680' |
| Cruising 75% | 230 | 200 | 1,500' |
| Economical | | | |

## BOMBS—CARGO

| | No. | Size | Total Lbs. |
|---|---|---|---|
| Normal | | | |
| Maximum | | | |

## ENGINES

| | H. P. | Altitude |
|---|---|---|
| Take-off | 1825 | S.L. |
| Normal | | |
| Military | 1655 | 6,900' |
| War Emerg. | 1520 | 18,700' |

Mfg. Mitsubishi

Model Kasei 24

Type Radial

Cylinders Cooling

Supercharger

Propeller Diam.

Fuel - Take-off Cruising

## WEIGHTS

| | Lbs. |
|---|---|
| Empty | |
| Gross | 7,700 |
| Overload | 7,962 |

## FUEL

| | U.S. gal. | Imp. gal. |
|---|---|---|
| Built-in | | |
| Internal (Removable) | | |
| External (drop) | | |
| Maximum | | |

## RANGE AND RADIUS

| | Miles | | Speed | | Alt. | Fuel gal. | | Bombs | Cargo |
|---|---|---|---|---|---|---|---|---|---|
| | stat. | naut. | mph. | Knts. | feet | U. S. | Imp. | lbs. | lbs. |
| Maximum range (maximum fuel) | | | | | | | | | |
| Maximum range (normal fuel) | | | | | | | | | |
| Radius ( ) | | | | | | | | | |
| Radius ( ) | | | | | | | | | |

## DIMENSIONS

Span 39.3' Length 35.4'

Height Wing area sq.ft.

## GENERAL DATA

REX 11 is now in operation and will probably replace RUFE as the main JNAF float plane fighter. GEORGE 11 is a modification of REX.

**RESTRICTED** Provisional Data **DATE** December 1944

# LUKE 11

Vulnerability, Fields of Fire, etc.

**ARMAMENT**

| | No. | Size | Rds. Gun | Type | | No. | Size | Rds. Gun | Type |
|---|---|---|---|---|---|---|---|---|---|
| Forward | 1 | 30 mm | 100 | Fixed | Tail | | | | |
| Top | 2 | 20 mm | 200 | Fixed | Wing | | | | |
| Side | | | | | | | | | |
| Bottom | | | | | | | | | |

**TACTICAL DATA**

No information

**DATE** December 1944

**RESTRICTED**

# PERFORMANCE AND CHARACTERISTICS — LUKE 11

## TAKE-OFF

| | Load | Feet |
|---|---|---|
| T.O. calm | | |
| T.O. 25 kt. wind | | |
| T.O. over 50' obstacle | | |
| Landing over 50' obstacle | | |

## CLIMB—CEILING

| @ lbs. | Feet | Min. |
|---|---|---|
| Rate @ S.L. | | |
| Rate @ ft. | | |
| Time to 26,250' | | 9.7 |
| Time to | | |
| Service ceiling | | |

## AIRCRAFT

Duty Interceptor Fighter

Designation (JINRAI) Model 11

Description Twin fuselage monoplane

Mfg. Mitsubishi

Engines 1 Crew 1

Construction

## SPEED

| @ lbs. | Mph. | Knts. | Altitude |
|---|---|---|---|
| Maximum | | | @ S. L. |
| Maximum | 437 | 380 | @ 26,250' |
| Cruising | | | |
| Economical | | | |

## BOMBS—CARGO

| | No. Size | Total Lbs. |
|---|---|---|
| Normal | 2 x 60 kg | 264 |
| Maximum | | |

## ENGINES

| | H. P. | Altitude |
|---|---|---|
| Take-off | 1970 | S.L. |
| Normal | | |
| Military | 1660<br>1380 | 6,500'<br>27,500' |
| War Emerg. | 1740 | 27,900' |

Mfg.

Model Mk 9D (Ha 43, Model 41)

Type Radial

Cylinders 18 Cooling Air

Supercharger 2 Stage

Propeller Pusher Diam.

Fuel - Take-off 92 Cruising 92 plus methanol

## WEIGHTS

| | Lbs. |
|---|---|
| Empty | |
| Gross | |
| Overload | |

## FUEL

| | U.S. gal. | Imp. gal. |
|---|---|---|
| Built-in | | |
| Internal (Removable) | | |
| External (drop) | | |
| Maximum | | |

## RANGE AND RADIUS

| | Miles stat. | Miles naut. | Speed mph. | Speed Knts. | Alt. feet | Fuel gal. U. S. | Fuel gal. Imp. | Bombs lbs. | Cargo lbs. |
|---|---|---|---|---|---|---|---|---|---|
| Maximum range (maximum fuel) | | | | | | | | | |
| Maximum range (normal fuel) | 575 | 500 | 288 | 250 | | | | | |
| Radius ( ) | | | | | | | | | |
| Radius ( ) | | | | | | | | | |

## DIMENSIONS

Span Length

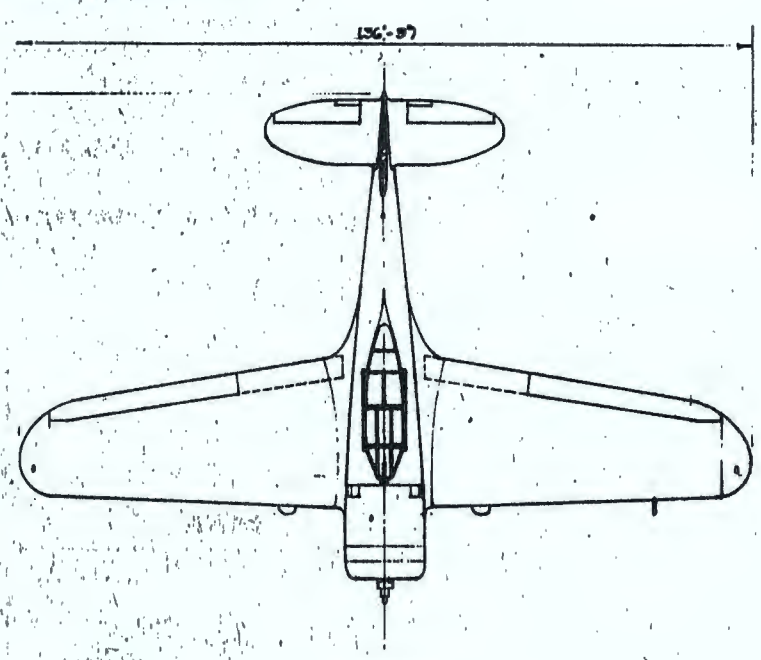
Height Wing area sq.ft.

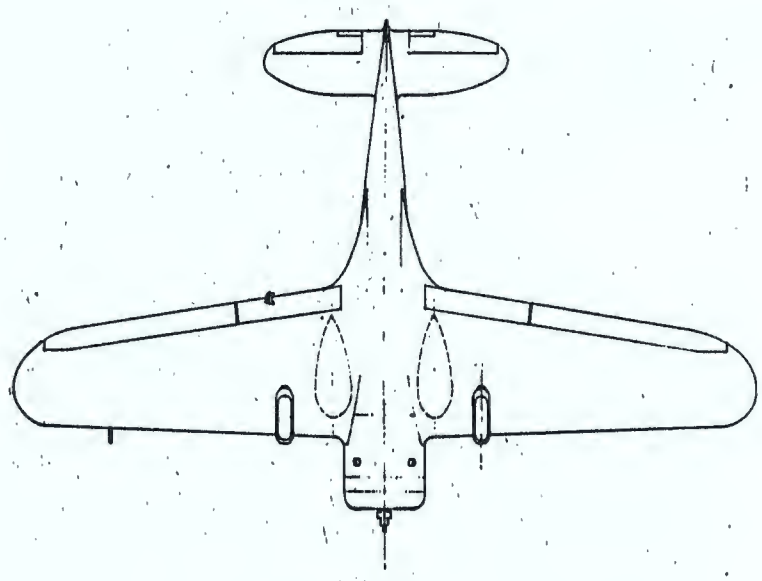
## GENERAL DATA

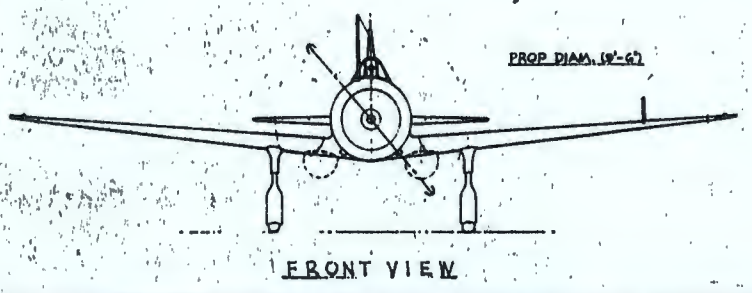
LUKE 11 is derived from 17 Experimental interceptor fighter manufactured by Mitsubishi. Described as a single-engine, twin-boom pusher type, LUKE is believed to have very high speed but short range. This plane may be used for air to air bombing.

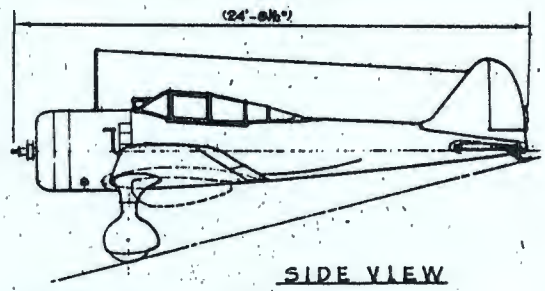
151A-1

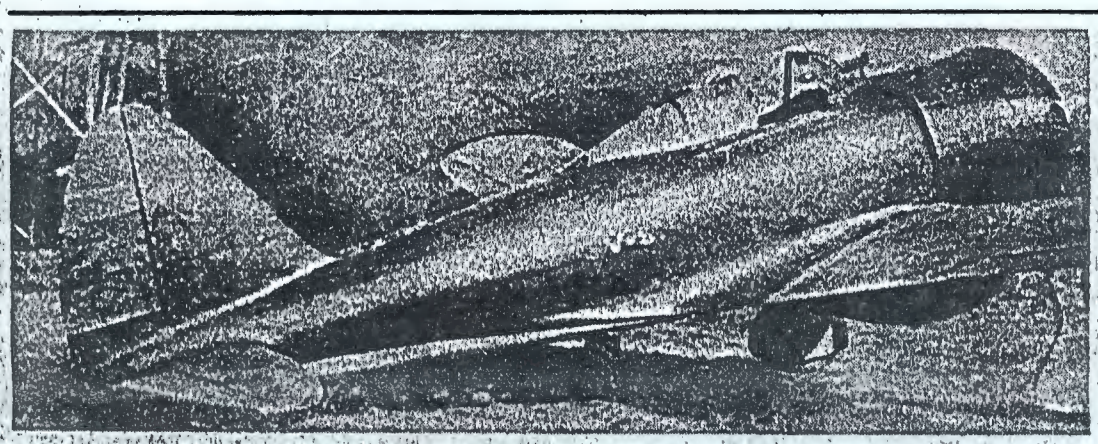
# NATE 1

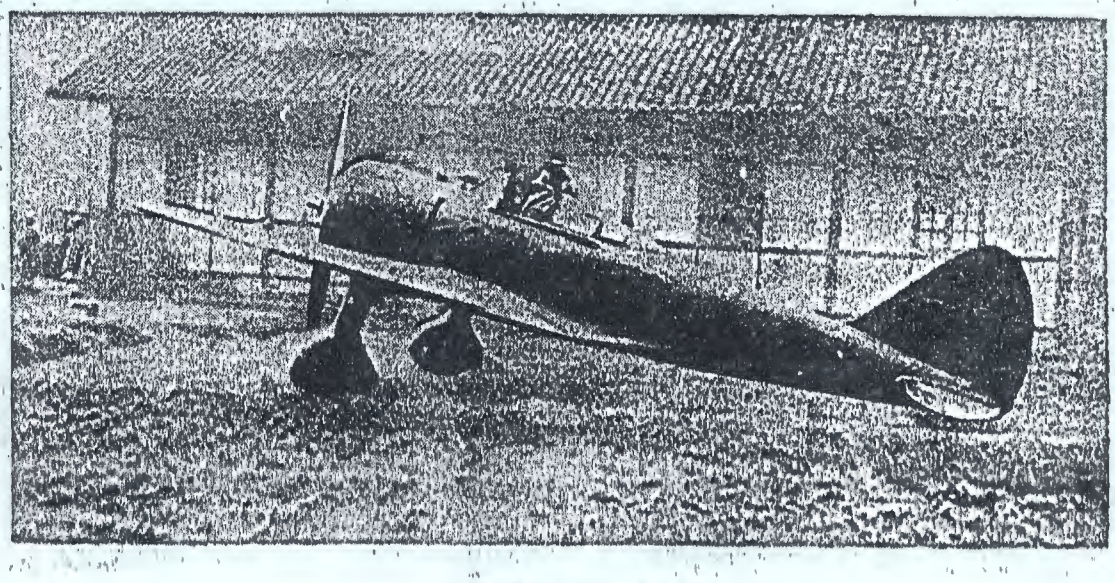




RESTRICTED

DATE July 1945

# PERFORMANCE AND CHARACTERISTICS

# NATE 1

## TAKE-OFF

| | Load | Feet |
|---|---|---|
| T.O. calm | | |
| T.O. 25 kt. wind | | |
| T.O. over 50' obstacle | | |
| Landing over 50' obstacle | | |

## CLIMB—CEILING

| @ lbs. | Feet | Min. |
|---|---|---|
| Rate @ S.L. | | |
| Rate @ ft. | | |
| Time to | | |
| Time to | | |
| Service ceiling | | |

## AIRCRAFT

Duty Fighter

Designation Type 97 (Ki 27)

Description Low wing Monoplane
Fixed Landing Gear

Mfg. Nakajima

Engines 1 Crew 1

Construction All metal

## SPEED

| @ 5200 lbs. Suicide Condition | Mph. | Knts. | Altitude |
|---|---|---|---|
| Max. with 1 x 500 kg. bomb | 222 | 193 | @ 9500' |
| Max. with 2 x 250 kg. bomb | 217 | 188 | @ 9500' |
| Max. Diving | 290 | 252 | |

## BOMBS—CARGO

| | No. Size | Total Lbs. |
|---|---|---|
| Normal | None | |
| Maximum (Suicide) | 1 x 500 kg | 1100 |
| or | 2 x 250 kg | 1100 |

## ENGINES

| | H. P. | Altitude |
|---|---|---|
| Take-off | 600 | S.L. |
| Normal | | |
| Military | 670 | 9,500' |
| War Emerg. | | |

Mfg. Nakajima

Model Type 97, 650 hp (Ha 1B)

Type Radial

Cylinders 9 Cooling Air

Supercharger Single Speed

Propeller 2 Blade Diam. 9.5'

Fuel -- Take-off 87 Cruising 87

## WEIGHTS

| | Lbs. |
|---|---|
| Empty | 3650 |
| Gross | 4600 |
| Suicide Overload | 5200 |

## FUEL

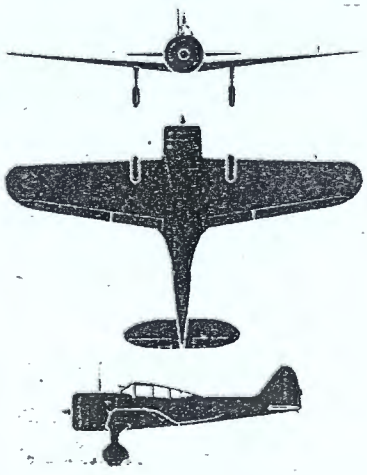
| | U.S. gal. | Imp. gal. |
|---|---|---|
| Built-in | 87 | 72 |
| Internal (Removable) | | |
| External (drop) | 64 | 53 |
| Maximum | 151 | 125 |

## RANGE AND RADIUS

| Suicide Conditions | Miles stat. | Miles naut. | Speed mph. | Speed Knts. | Alt. feet | Fuel gal. U. S. | Fuel gal. Imp. | Bombs lbs. | Cargo lbs. |
|---|---|---|---|---|---|---|---|---|---|
| Max. Range | 300 | 260 | 112 | 97 | 1500 | 44 | 37 | 1x1100 | None |
| R @ Combat Cr. | 120 | 104 | 184 | 160 | 1500 | 44 | 37 | 1x1100 | None |
| Max. Range | 290 | 252 | 110 | 95 | 1500 | 44 | 37 | 2x550 | None |
| R @ Combat Cr. | 115 | 100 | 180 | 156 | 1500 | 44 | 37 | 2x550 | None |

## DIMENSIONS

Span 36.7' Length 24.7'
Height 10'10" Wing area 200 sq.ft.



## GENERAL DATA

Suicide Conditions - The assumption is made that the above bomb loads can be secured to the aircraft externally.

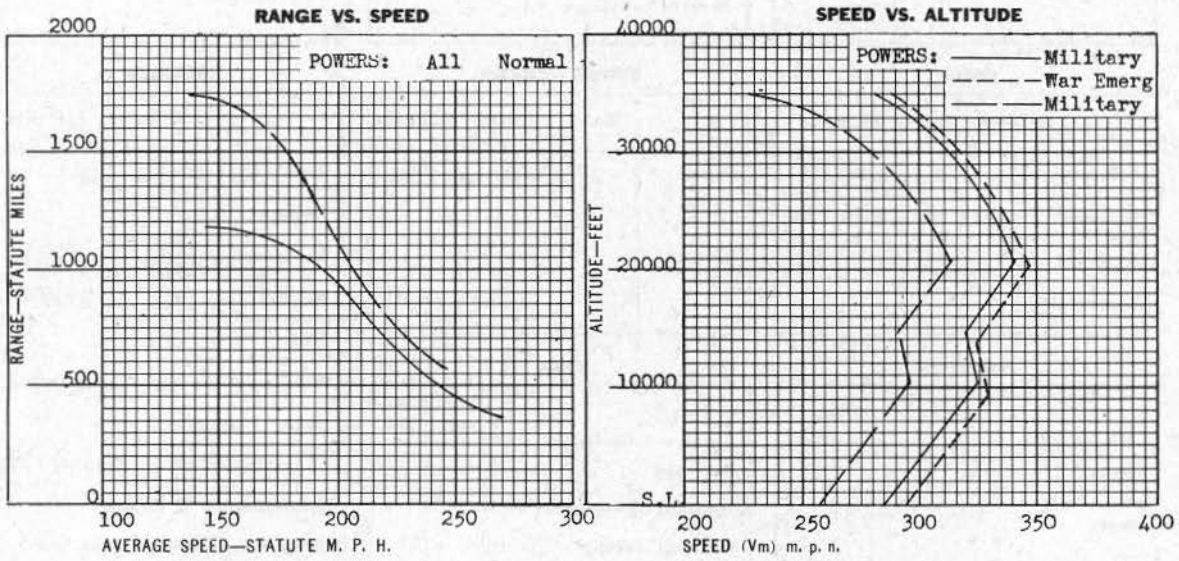
Armament - 2 x 7.7 mm Type 89 Fixed Machine guns mounted in nose (500 rounds per gun)

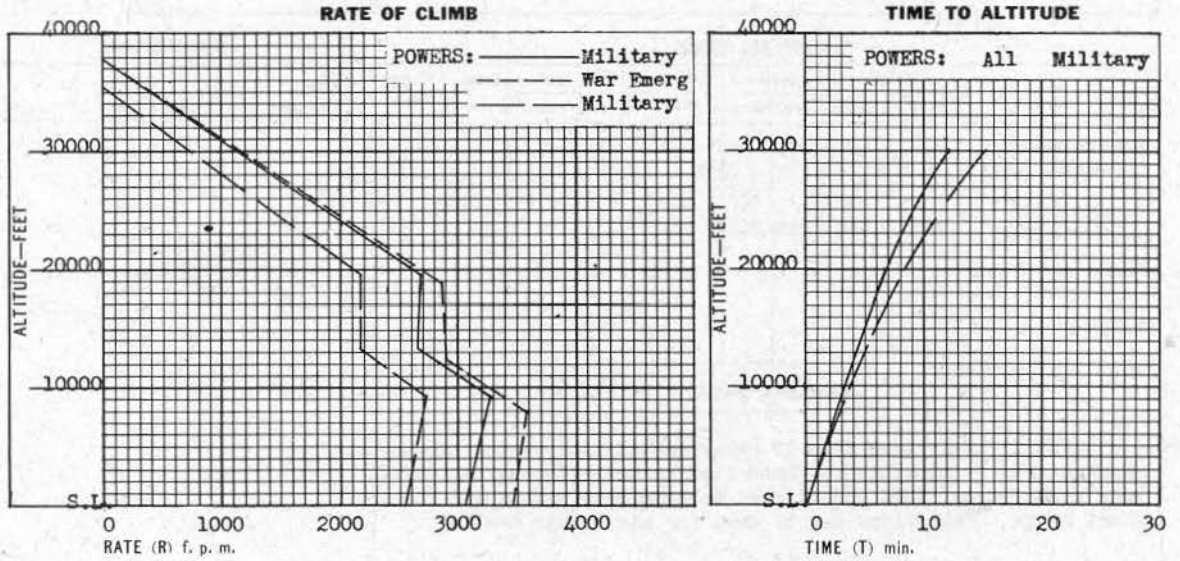
152A-1

# OSCAR 2

## RANGE * SPEED * CLIMB

| KEY | CONDITION | WEIGHT (lb.) | FUEL LOAD (lb.) | BOMBS—CARGO (lb.) |
|---|---|---|---|---|
| ——— | NORMAL FIGHTER | 5500 | 892 | None |
| - - - - - - - - - - | NORMAL FIGHTER | 5500 | 892 | None |
| —— —— —— | OVERLOAD FIGHTER | 6240 | 1540 | None |




**DATE** March 1945

**RESTRICTED**

# PERFORMANCE AND CHARACTERISTICS

# OSCAR 2

### TAKE-OFF

| | Load | Feet |
|---|---|---|
| T.O. calm | 5500 | 450 |
| T.O. 25 kt. wind | 5500 | 175 |
| T.O. over 50' obstacle | | |
| Landing over 50' obstacle | | |

### CLIMB—CEILING

| @ 5500 lbs. | Feet | Min. |
|---|---|---|
| Rate @ S.L. | 3290 | 1 |
| Rate @ 17,500 ft. | 2850 | 1 |
| Time to 10,000' | | 3.0 |
| Time to 20,000' | | 6.5 |
| Service ceiling 37,100' | | |

### AIRCRAFT

Duty Fighter

Designation Type 1, Ki 43

Description Low-Wing Monoplane

Mfg. Nakajima

Engines 1 Crew 1

Construction All metal

### SPEED

| @ 5500 lbs. | Mph. | Knts. | Altitude |
|---|---|---|---|
| Maximum WE | 295 | 256 | @ S. L. |
| Maximum WE | 347 | 301 | @ 20,000' |
| Cruising 75% | 202 | 175 | 1,500' |
| Economical | | | |

### BOMBS—CARGO

| | No. | Size | Total Lbs. |
|---|---|---|---|
| Normal | None | | |
| Maximum | 2 | 100 kg | 440 |

### ENGINES

| | H. P. | Altitude |
|---|---|---|
| Take-off | 1105 | S.L. |
| Normal | 925<br>800 | 9,350'<br>20,000' |
| Military | 1085<br>965 | 9,200'<br>19,700' |
| War Emerg. | 1165 | 8,000' |

Mfg. Nakajima

Model Type 2 1150 h.p.

Type Radial

Cylinders 14 Cooling Air

Supercharger 2 Speed

Propeller 3 Blade Diam. 9.2' C.S.

Fuel - Take-off 92 Cruising 92

### WEIGHTS

| | Lbs. |
|---|---|
| Empty | 4170 |
| Gross | 5500 |
| Overload | 6240 |

### FUEL

| | U.S. gal. | Imp. gal. |
|---|---|---|
| Built-in | 149 | 123 |
| Internal (Removable) | | |
| External (drop) | 108 | 90 |
| Maximum | 257 | 213 |

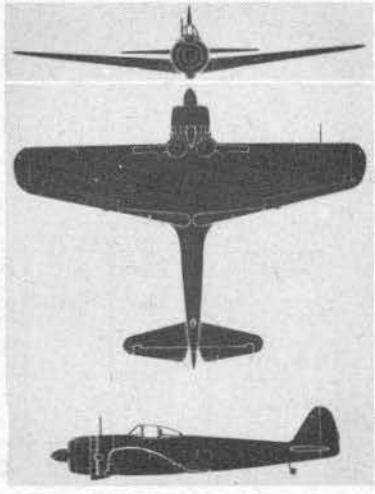
### RANGE AND RADIUS

| | Miles | | Speed | | Alt. feet | Fuel gal. | | Bombs lbs. | Cargo lbs. |
|---|---|---|---|---|---|---|---|---|---|
| | stat. | naut. | mph. | Knts. | | U. S. | Imp. | | |
| Maximum range (maximum fuel) | 1745 | 1515 | 137 | 119 | 1500 | 257 | 213 | None | None |
| At 75% Vmax. | 1405 | 1220 | 185 | 160 | 1500 | 257 | 213 | None | None |
| Maximum range (normal fuel) | 1180 | 1025 | 145 | 126 | 1500 | 149 | 123 | None | None |
| At 75% Vmax. | 915 | 795 | 202 | 175 | 1500 | 149 | 123 | None | None |
| Radius ( ) | | | | | | | | | |
| Radius ( ) | | | | | | | | | |

### DIMENSIONS

Span 35.6' Length 29.2'

Height 9' Wing area 232 sq.ft.



### GENERAL DATA

These figures are for the "short wing" OSCAR 2 since comparatively few OSCAR 2's have been built with the longer wing. Short wing is the same except for 2 ft. less span and blunter tips. Tips are rounded not squared as on ZEKE 32. OSCAR 2 has been established as operational in every enemy theater patrolled by the JAF. It is highly maneuverable with a good rate of climb. Recent reports indicate increased performance, possibly through water injection. OSCAR 1 is obsolescent.

**RESTRICTED**

**DATE** December 1944

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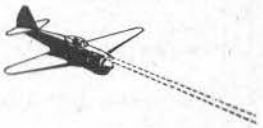
152A-3

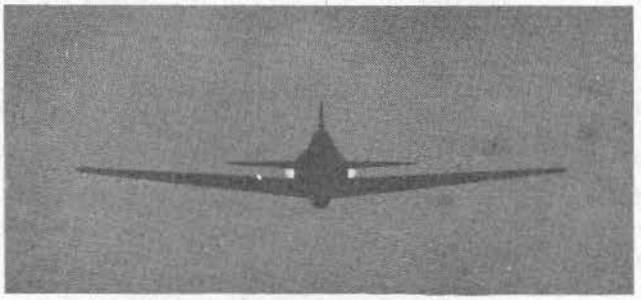
# OSCAR 2

## FIELDS OF FIRE



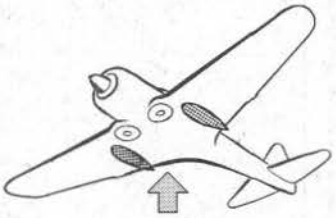
FORWARD GUNS "A"
¾-front view from above

## EXHAUST FLAME PATTERNS

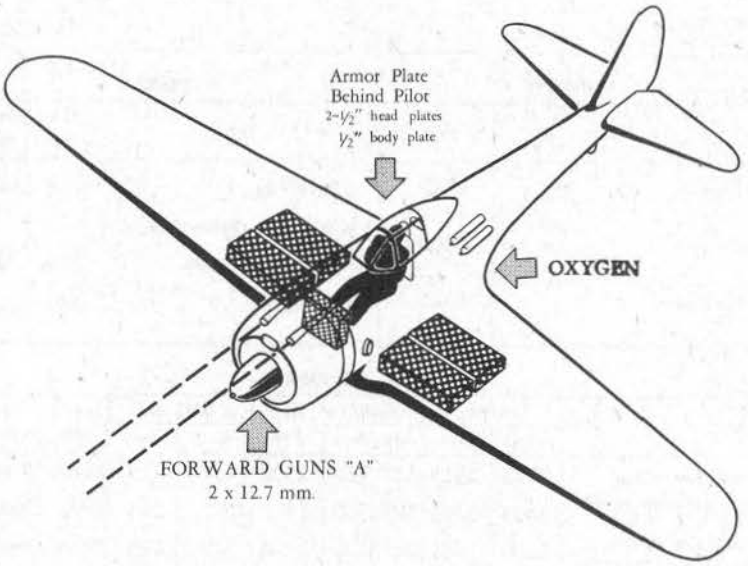


REAR VIEW

## VULNERABILITY



Auxiliary gas tanks
Jettisonable




LEGEND

- Fuel tanks, unprotected
- Fuel tanks, protected
- Oil tanks, unprotected
- Oil tanks, protected

### ARMAMENT

| | No. | Size | Rds. Gun | Type | | No. | Size | Rds. Gun | Type |
|---|---|---|---|---|---|---|---|---|---|
| Forward | 2 | 12.7 mm | 250 | Fixed | Tail | | | | |
| Top | 2 | or 20 mm | 150 | Fixed | Wing | | | | |
| Side | | | | | | | | | |
| Bottom | | | | | | | | | |

### TACTICAL DATA

12 mm armor plate behind pilot.

Fuel tanks are equipped with protective rubber coating.

OSCAR 2 has a diving speed restriction of 372 mph.

**DATE** March 1945

**RESTRICTED**

# PERFORMANCE AND CHARACTERISTICS — NICK 1

## TAKE-OFF

| | Load | Feet |
|---|---|---|
| T.O. calm | 12213 | 677 |
| T.O. 25 kt. wind | 12213 | 305 |
| T.O. over 50' obstacle | | |
| Landing over 50' obstacle | | |

## CLIMB—CEILING

| @ 12213 lbs. | Feet | Min. |
|---|---|---|
| Rate @ S.L. | 2595 | 1 |
| Rate @ 9,200 ft. | 2725 | 1 |
| Time to | | |
| Time to | | |

Service ceiling 35,050'

## AIRCRAFT

Duty Night Fighter - Ground Attack

Designation Type 2, Ki 45

Description Low Mid-wing Monoplane

Mfg. Kawasaki

Engines 2 Crew 2

Construction All Metal

## SPEED

| @12213 lbs. | Mph. | Knts. | Altitude |
|---|---|---|---|
| Maximum | 286 | 248 | @ S. L. |
| War Emerg. | 294 | 255 | @ S. L. |
| Maximum | 346 | 300 | @ 21,100' |
| War Emerg. | 354 | 307 | @ 20,600' |
| Cruising 75% | 203 | 178 | 1,500' |
| Economical | | | |

## BOMBS—CARGO

| | No. Size | Total Lbs. |
|---|---|---|
| Normal | None | |
| Maximum | | |

## ENGINES

| | H. P. | Altitude |
|---|---|---|
| Take-off | 1065 | S.L. |
| Normal | | |
| Military | 1040 | 9,200' |
| | 935 | 19,000' |
| War Emerg. | 1135 | 8,500' |

Mfg. Mitsubishi

Model Type 1, 1050 hp

Type Radial

Cylinders 14 Cooling Air

Supercharger 2 Speed

Propeller 3 blade CS Diam. 10'

Fuel—Take-off 92 Cruising 92

## WEIGHTS

| | Lbs. |
|---|---|
| Empty | 8335 |
| Gross | 12213 |
| Overload | |

## FUEL

| | U.S. gal. | Imp. gal. |
|---|---|---|
| Built-in | 363 | 301 |
| Internal (Removable) | | |
| External (drop) | | |
| Maximum | | |

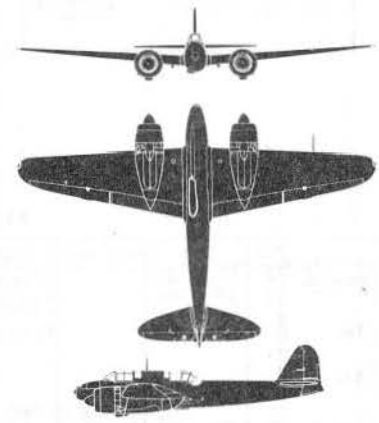
## RANGE AND RADIUS

| | Miles stat. | Miles naut. | Speed mph. | Speed Knts. | Alt. feet | Fuel gal. U. S. | Fuel gal. Imp. | Bombs lbs. | Cargo lbs. |
|---|---|---|---|---|---|---|---|---|---|
| Maximum range (maximum fuel) | | | | | | | | | |
| Maximum range (normal fuel) | 1405 | 1229 | 152 | 131 | 1500 | 363 | 301 | None | None |
| At 75% Vmax. Radius ( ) | 1125 | 977 | 203 | 178 | 1500 | 363 | 301 | None | None |
| Radius ( ) | | | | | | | | | |

## DIMENSIONS

Span 49.5' Length 34.7'

Height Wing area 365 sq. ft.

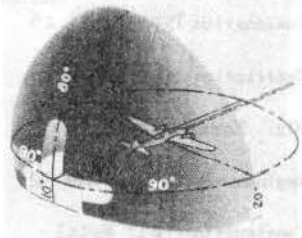


## GENERAL DATA

All performance figures calculated. NICK has been described as "maneuverable for a twin-engined plane" and "fast in a dive". Combat reports however indicate NICK cannot dive or maneuver with late P-40s and explodes when hit in fuel tanks. This plane has been used as a night fighter with indifferent success and the 37 mm cannon indicates that it may also be used for ground attack. Although not definitely known it is believed that two light bombs could also be carried.

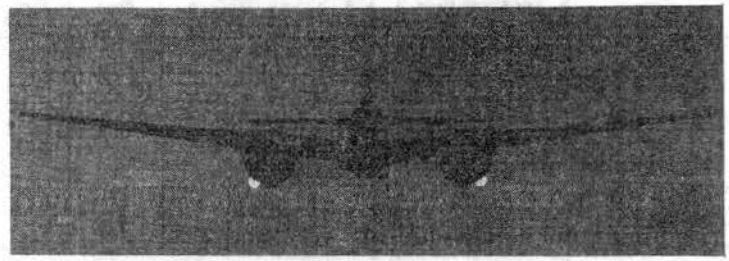
# NICK 1

## FIELDS OF FIRE

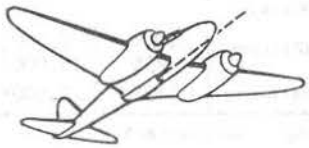



FORWARD GUNS "A" AND TOP GUN "B"
¾-rear view from above

## EXHAUST FLAME PATTERNS

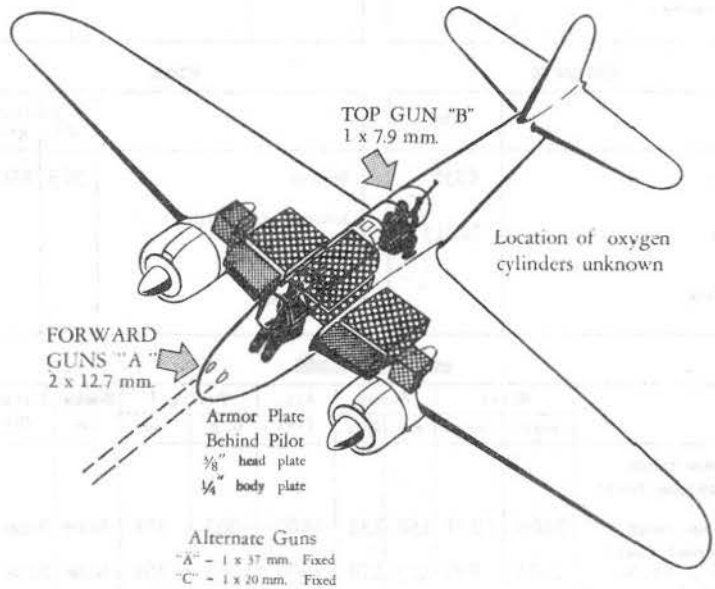


REAR VIEW



BOTTOM FORWARD GUN "C"
1 x 37 mm.
Loaded manually by rear gunner.
¾-front view from below

## VULNERABILITY


TOP GUN "B"
1 x 7.9 mm.
Location of oxygen cylinders unknown
FORWARD GUNS "A"
2 x 12.7 mm.
Armor Plate Behind Pilot
⅜" head plate
¼" body plate
Alternate Guns
"A" - 1 x 37 mm. Fixed
"C" - 1 x 20 mm. Fixed

LEGEND

- Fuel tanks, unprotected
- Fuel tanks, protected
- Oil tanks, unprotected
- Oil tanks, protected

## ARMAMENT

| | No. | Size | Rds. Gun | Type | | No. | Size | Rds. Gun | Type |
|---|---|---|---|---|---|---|---|---|---|
| Forward | 2 | 12.7 mm | | Fixed | Tail | | | | |
| or | 1 | 37 mm | | Fixed | | | | | |
| Top | 1 | 7.9 mm | | Flex. | Wing | | | | |
| Side | | | | | | | | | |
| Bottom | 1 | 20 mm | Slung under fuselage firing forward. | | | | | | |

## TACTICAL DATA

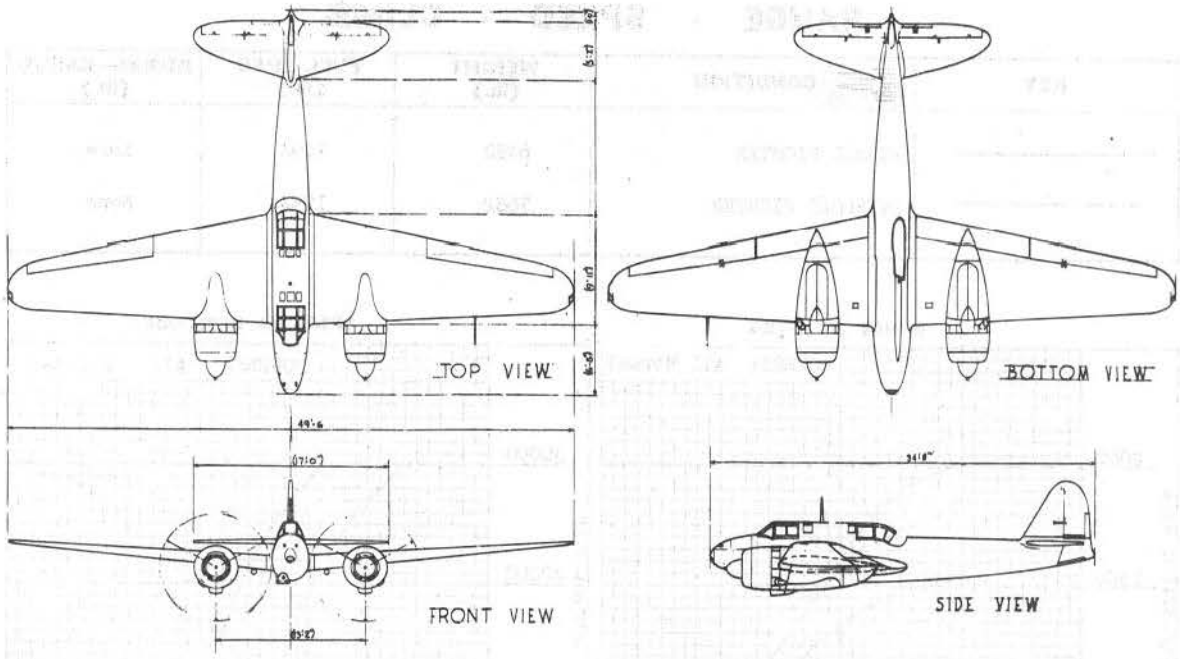
NICK carries armor plate for the back of the pilot's seat. Rear gunner is unprotected. Some reports mention the use of phosphorus air-to air bombs by NICK.

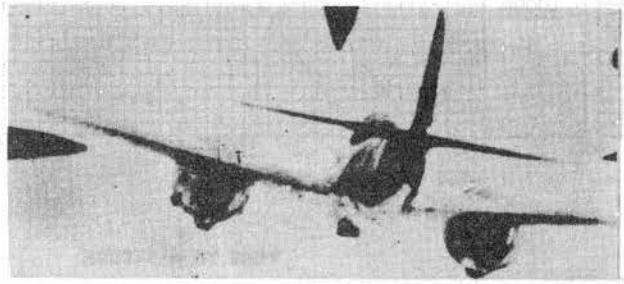
Latest information indicates 20 mm slung under fuselage with 37 mm or 2 x 12.7 in nose.

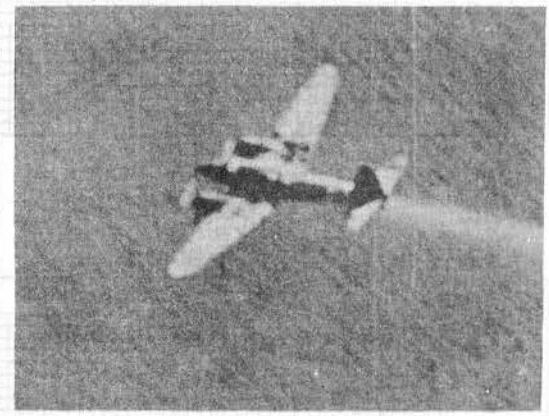
**DATE** December 1944

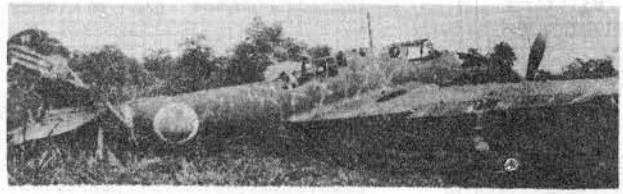
**RESTRICTED**

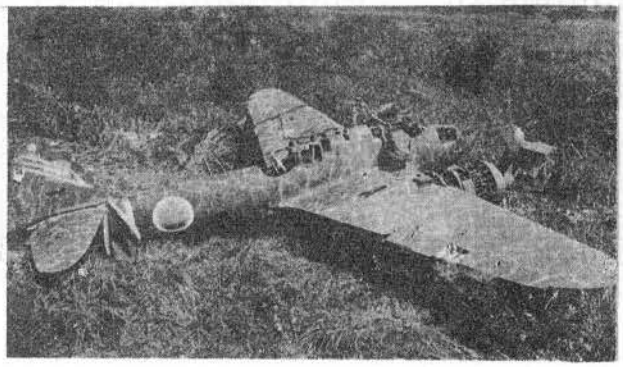
# NICK 1

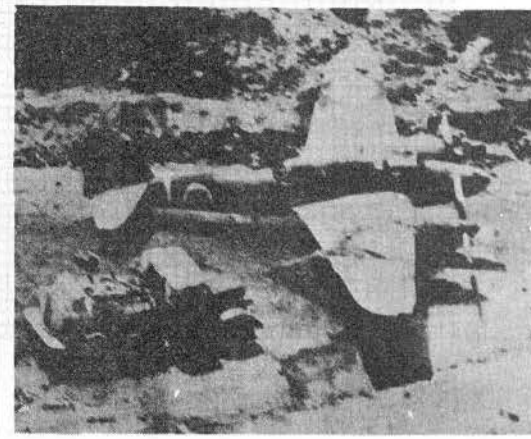








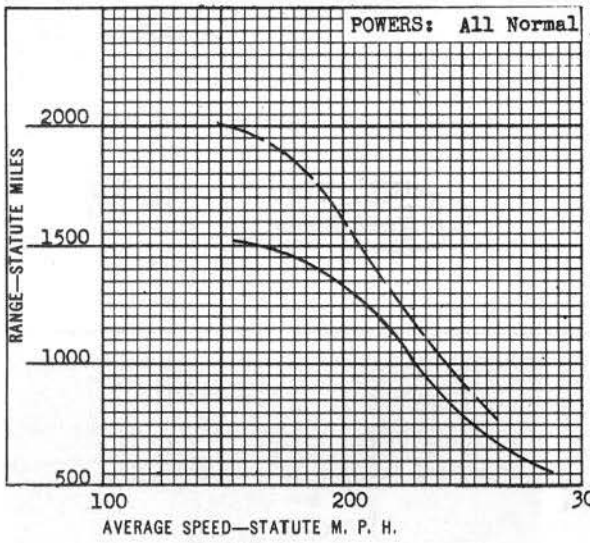


# TONY 1

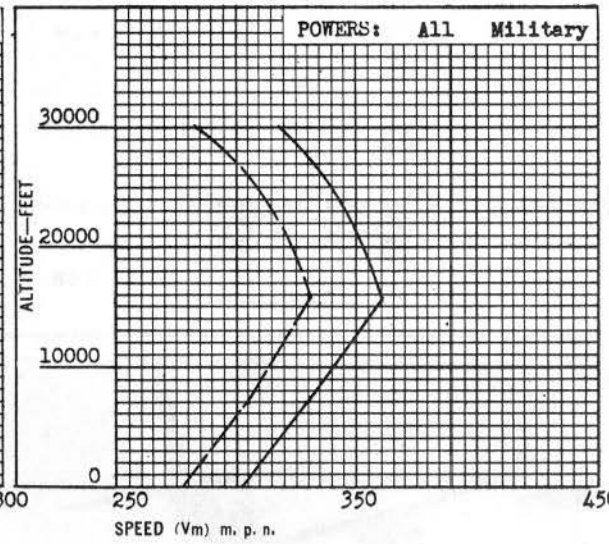
## RANGE * SPEED * CLIMB

| KEY | CONDITION | WEIGHT (lb.) | FUEL LOAD (lb.) | BOMBS—CARGO (lb.) |
|---|---|---|---|---|
| ——— | NORMAL FIGHTER | 6982 | 1194 | None |
| — — — — | OVERLOAD FIGHTER | 7682 | 1794 | None |

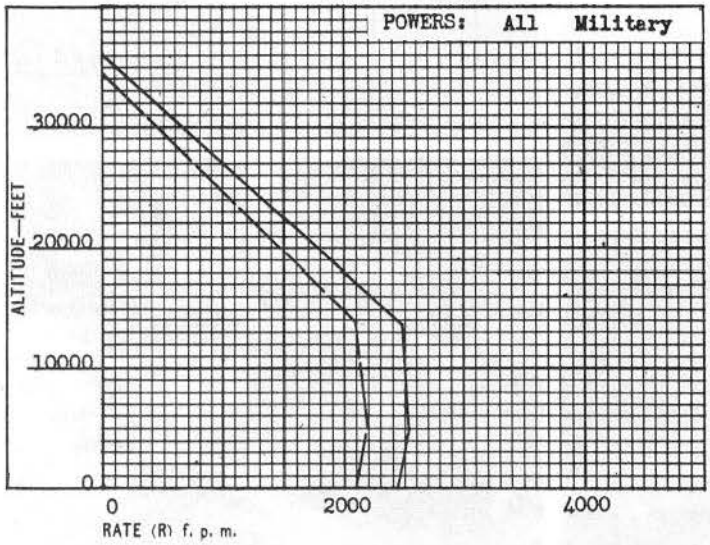
**RANGE VS. SPEED**



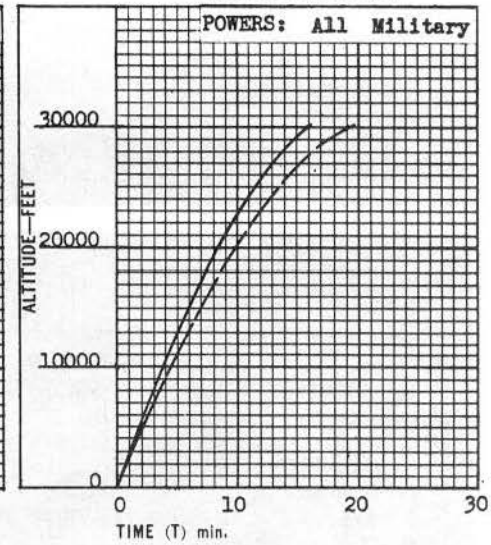

**SPEED VS. ALTITUDE**




**RATE OF CLIMB**




**TIME TO ALTITUDE**




**DATE** December 1944

**RESTRICTED**

# PERFORMANCE AND CHARACTERISTICS

# TONY 1

## TAKE-OFF

| | Load | Feet |
|---|---|---|
| T. O. calm | Gross | 744 |
| T. O. 25 kt. wind | Gross | 338 |
| T. O. over 50' obstacle | | |
| Landing over 50' obstacle | | |

## CLIMB—CEILING

| @ 6982 lbs. | Feet | Min. |
|---|---|---|
| Rate @ S. L. | 2440 | 1 |
| Rate @ 13,800 ft. | 2470 | 1 |
| Time to 10,000' | | 4.0 |
| Time to 20,000' | | 8.45 |
| Service ceiling 35,100' | | |

## AIRCRAFT

Duty Fighter

Designation Type 3, Ki 61

Description Low-wing Monoplane

Mfg. Kawasaki

Engines 1 Crew 1

Construction All metal

## SPEED

| @ 6982 lbs. | Mph. | Knts. | Altitude |
|---|---|---|---|
| Maximum | 302 | 262 | @ S. L. |
| Maximum | 361 | 314 | @ 15,800' |
| Cruising 75% | 215 | 187 | 1,500' |
| Economical | | | |

## BOMBS—CARGO

| | No. | Size | Total Lbs. |
|---|---|---|---|
| Normal | None | | |
| Maximum | 2 | 100 kg | 440 |

## ENGINES

| | H. P. | Altitude |
|---|---|---|
| Take-off | 1160 | S.L. |
| Normal | 935<br>940 | 5,200'<br>13,200' |
| Military | 1030<br>1085 | S.L.<br>13,800' |
| War Emerg. | 1100 | 12,600' |

Mfg. Kawasaki

Model Type 2, 1100 HP

Type Inverted 60° V

Cylinders 12 Cooling Liquid

Supercharger 2 Speed hydraulic

Propeller 3 Blade Diam. 10.3'

Fuel - Take-off 92 C.S. Cruising 92

## WEIGHTS

| | Lbs. |
|---|---|
| Empty | 5010 |
| Gross | 6982 |
| Overload | 7682 |

## FUEL

| | U.S. gal. | Imp. gal. |
|---|---|---|
| Built-in | 199 | 165 |
| Internal (Removable) | | |
| External (drop) | 100 | 83 |
| Maximum | 299 | 248 |

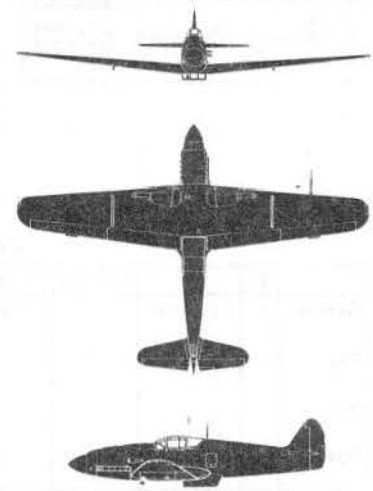
## RANGE AND RADIUS

| | Miles stat. | Miles naut. | Speed mph. | Speed Knts. | Alt. feet | Fuel gal. U. S. | Fuel gal. Imp. | Bombs lbs. | Cargo lbs. |
|---|---|---|---|---|---|---|---|---|---|
| Maximum range (maximum fuel) | 2010 | 1745 | 148 | 128 | 1500 | 299 | 248 | None | None |
| @ 75% VM | 1625 | 1411 | 198 | 171 | 1500 | 299 | 248 | None | None |
| Maximum range (normal fuel) | 1520 | 1320 | 156 | 135 | 1500 | 199 | 165 | None | None |
| @ 75% VM | 1195 | 1040 | 215 | 187 | 1500 | 199 | 165 | None | None |
| Radius ( ) | | | | | | | | | |
| Radius ( ) | | | | | | | | | |

## DIMENSIONS

Span 39.3' Length 28.9'

Height Wing area 215 sq.ft.



## GENERAL DATA

TONY is equipped with leak proof internal tanks and armor is fitted behind and under the pilot. Because of better fuel and pilot protection this aircraft represents a distinct improvement in Jap fighters.

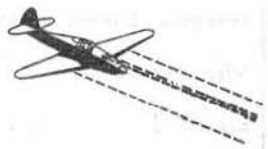
External wing racks may carry two 50 gallon fuel tanks or two 220 lb. bombs.

RESTRICTED

DATE December 1944

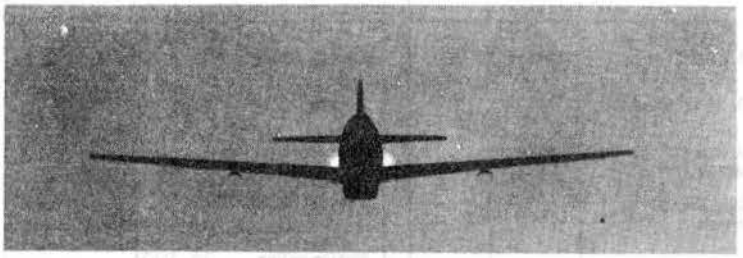
# TONY 1

## FIELDS OF FIRE



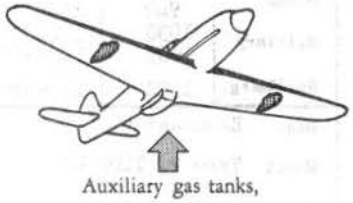
FORWARD GUNS
"A", AND "B"
¾-front view from above

## EXHAUST FLAME PATTERNS

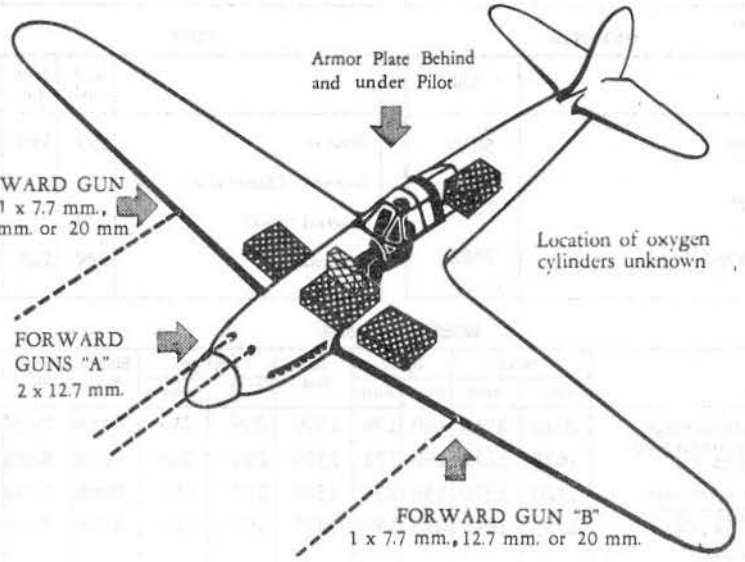


REAR VIEW

## VULNERABILITY



Auxiliary gas tanks,
Jettisonable




LEGEND

- Fuel tanks, unprotected
- Fuel tanks, self-sealing
- Oil tanks, unprotected
- Oil tanks, self-sealing

## ARMAMENT

| | No. | Size | Rds. Gun | Type | | No. | Size | Rds. Gun | Type |
|---|---|---|---|---|---|---|---|---|---|
| Forward | 2 | 12.7 mm | | Fixed | Tail | | | | |
| Top | | | | | Wing | 2 | 12.7 mm | | Fixed |
| Side | | | | | or | 2 | 20 mm | | Fixed |
| Bottom | | | | | | | | | |

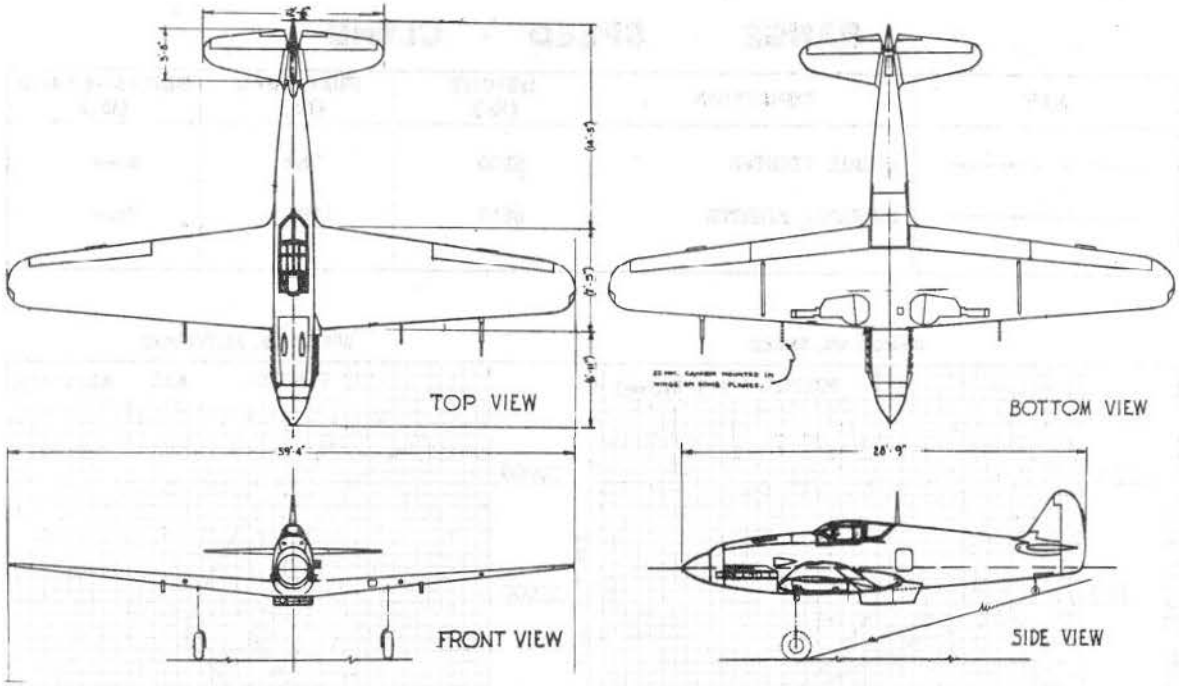
## TACTICAL DATA

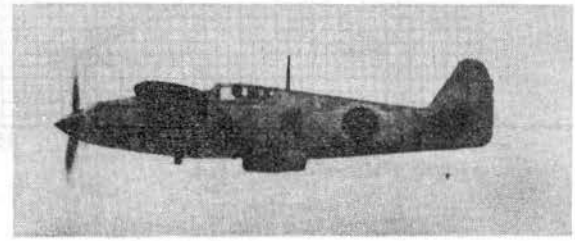
Armor plate is used to protect the radiator.

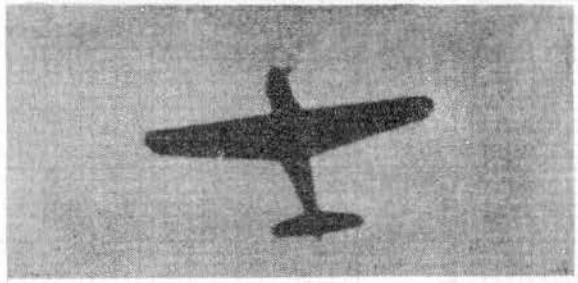
**DATE** December 1944

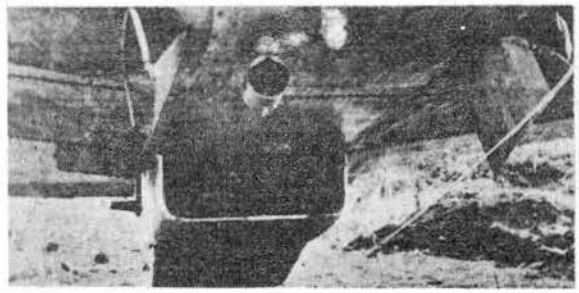
**RESTRICTED**

# TONY 1









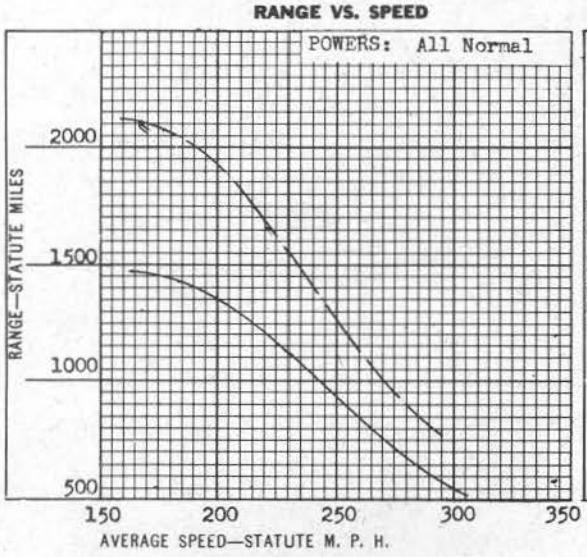
**RESTRICTED**

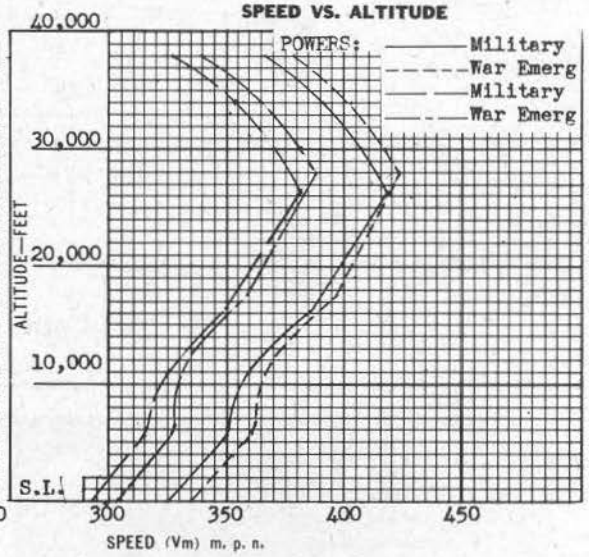
**DATE** December 1944

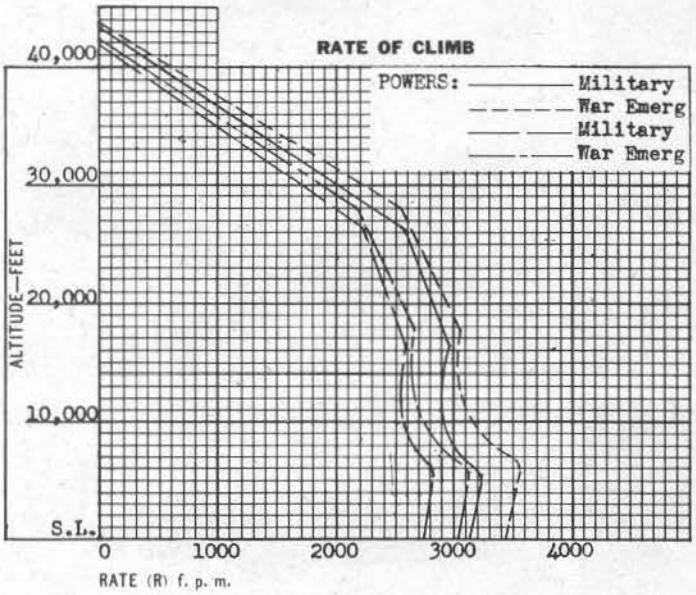
# TONY 2

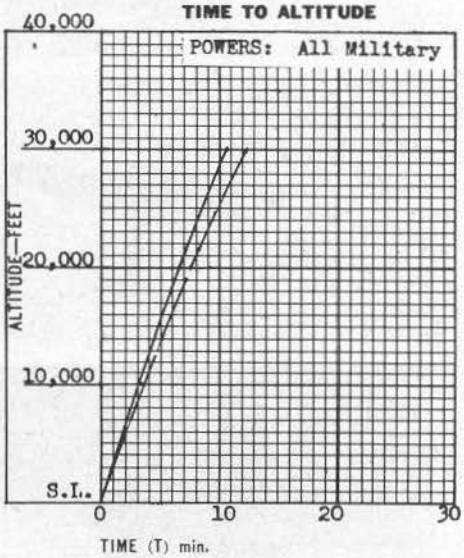
## RANGE * SPEED * CLIMB

| KEY | CONDITION | WEIGHT (lb.) | FUEL LOAD (lb.) | BOMBS—CARGO (lb.) |
|---|---|---|---|---|
| ——— | NORMAL FIGHTER | 7232 | 1196 | None |
| – – – – | NORMAL FIGHTER | 7232 | 1196 | None |
| ——— ——— | OVERLOAD FIGHTER | 7929 | 1830 | None |
| ——— – ——— – | OVERLOAD FIGHTER | 7929 | 1830 | None |




**DATE** March 1945

**RESTRICTED**

# PERFORMANCE AND CHARACTERISTICS

# TONY 2

## TAKE-OFF

| | Load | Feet |
|---|---|---|
| **Runway Requirements** | 7232 | 1000 |
| T.O. over 50' obstacle | | |
| Landing over 50' obstacle | | |
| * T.O. + 100% | | |

## CLIMB—CEILING

| @ 7232 lbs. | Feet | Min. |
|---|---|---|
| Rate @ S.L. | 3120 | 1 |
| Rate @ 5550 ft. | 3230 | 1 |
| Time to 10,000' | | 3.2 |
| Time to 20,000' | | 6.6 |
| Service ceiling 43,300' | | |

## AIRCRAFT

Duty Fighter

Designation Type 3, Model 2 Ki 61

Description Low-wing Monoplane

Mfg. Kawasaki

Engines 1 Crew 1

Construction All Metal

## SPEED

| @ 7232 lbs. | Mph. | Knts. | Altitude |
|---|---|---|---|
| Maximum WE | 335 | 291 | @ S. L. |
| Maximum WE | 423 | 368 | @ 28,000' |
| Cruising | | | |
| Economical | | | |

## BOMBS—CARGO

| | No. | Size | Total Lbs. |
|---|---|---|---|
| Normal | | | None |
| Maximum | 2 | 100 kg. | 440 |

## ENGINES

| | H. P. | Altitude |
|---|---|---|
| Take-off | 1380 | S.L. |
| Normal | | |
| Military | 1320 | 5550 |
| War Emerg. | 1440 | 5700 |

Mfg. Kawasaki

Model Ha 140

Type Inverted 60° Vee

Cylinders 12 Cooling Liquid

Supercharger 2 Stage variable speed

Propeller 4 Blade C.S. Diam. 10'

Fuel - Take-off 92 Cruising 92

## WEIGHTS

| | Lbs. |
|---|---|
| Empty | 5260 |
| Gross | 7232 |
| Overload | 7929 |

## FUEL

| | U.S. gal. | Imp. gal. |
|---|---|---|
| Built-in | 199 | 162 |
| Internal (Removable) | | |
| External (drop) | 106 | 93 |
| Maximum | 305 | 255 |

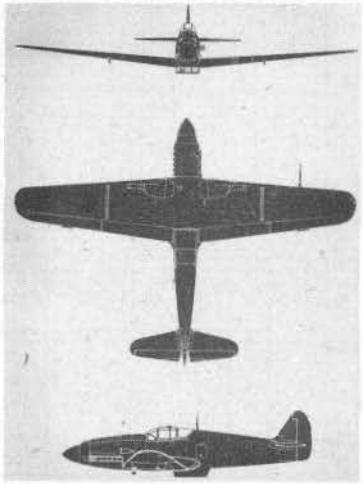
## RANGE AND RADIUS

| | Miles | | Speed | | Alt. feet | Fuel gal. | | Bombs lbs. | Cargo lbs. |
|---|---|---|---|---|---|---|---|---|---|
| | stat. | naut. | mph. | Knts. | | U. S. | Imp. | | |
| Maximum range (maximum fuel) | 2120 | 1842 | 160 | 139 | 1500 | 305 | 255 | None | None |
| At 75% Vmax. | 1655 | 1436 | 221 | 192 | 1500 | 305 | 255 | None | None |
| Maximum range (normal fuel) | 1470 | 1276 | 163 | 141 | 1500 | 199 | 162 | None | None |
| At 75% Vmax. | 1130 | 893 | 229 | 199 | 1500 | 199 | 162 | None | None |
| Radius ( ) | | | | | | | | | |
| Radius ( ) | | | | | | | | | |

## DIMENSIONS

Span 39.3' Length 28.9'

Height 9.2' Wing area 215 sq.ft.



## GENERAL DATA

Performance figures are based on fragmentary documentary evidence and resultant extrapolation of engine ratings.

Photographs are those of TONY 1. Airframe and dimensions are assumed to be the same.

**RESTRICTED** Provisional Data **DATE** March 1945

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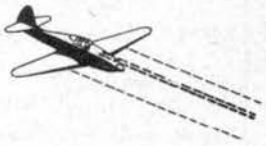
# TONY 2

## FIELDS OF FIRE

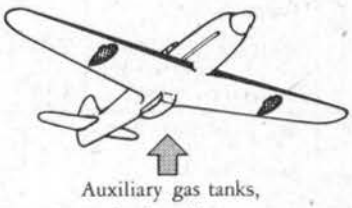


FORWARD GUNS
"A", AND "B"
¾-front view from above

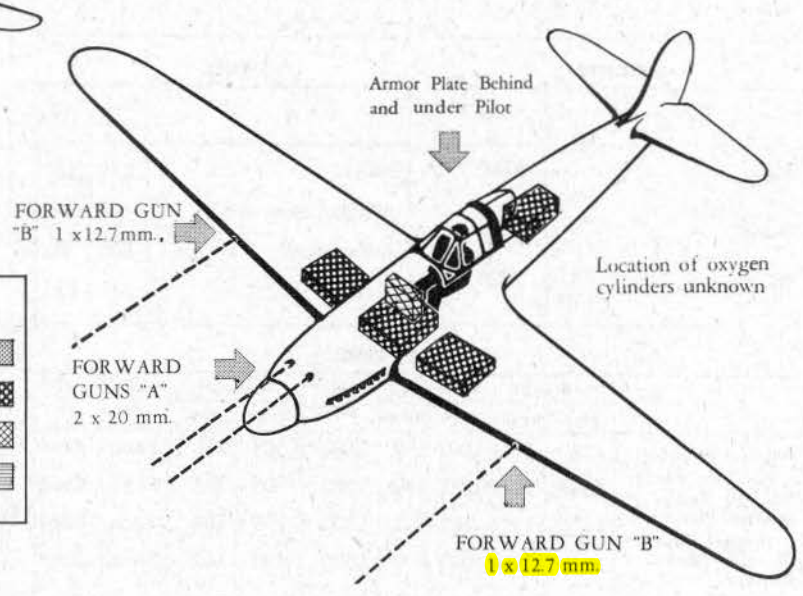
## EXHAUST FLAME PATTERNS

REAR VIEW

## VULNERABILITY



Auxiliary gas tanks,
Jettisonable




LEGEND

- Fuel tanks, unprotected
- Fuel tanks, self-sealing
- Oil tanks, unprotected
- Oil tanks, self-sealing

### ARMAMENT

| | No. | Size | Rds. Gun | Type | | No. | Size | Rds. Gun | Type |
|---|---|---|---|---|---|---|---|---|---|
| Forward | 2 | 12.7 mm or | 250 | Fixed | Tail | | | | |
| Cowl | | | | | | | | | |
| Top | 2 | 20 mm | 150 | Fixed | Wing | 2 | 12.7 mm or | 200 | Fixed |
| Side | | | | | | 2 | 20 mm | 100 | Fixed |
| Bottom | | | | | | | | | |

### TACTICAL DATA

Armor plate is used to protect the radiator.

**DATE** March 1945

**RESTRICTED**

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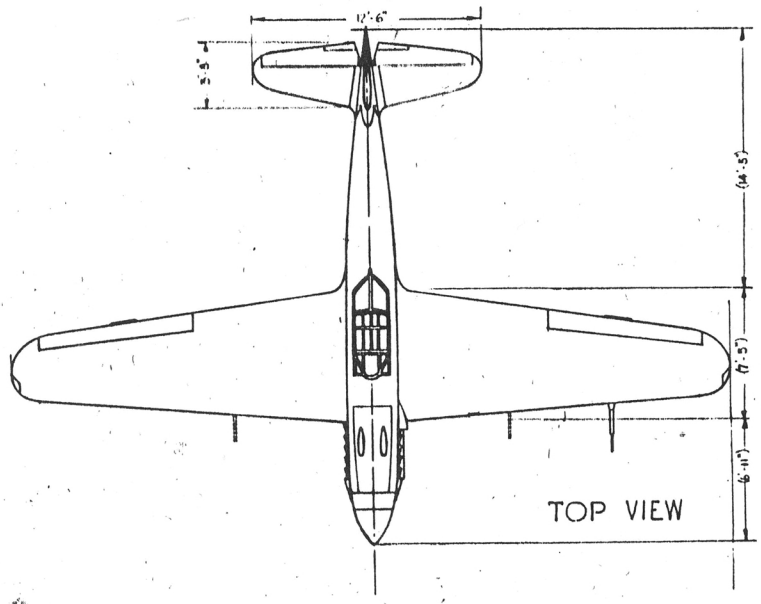
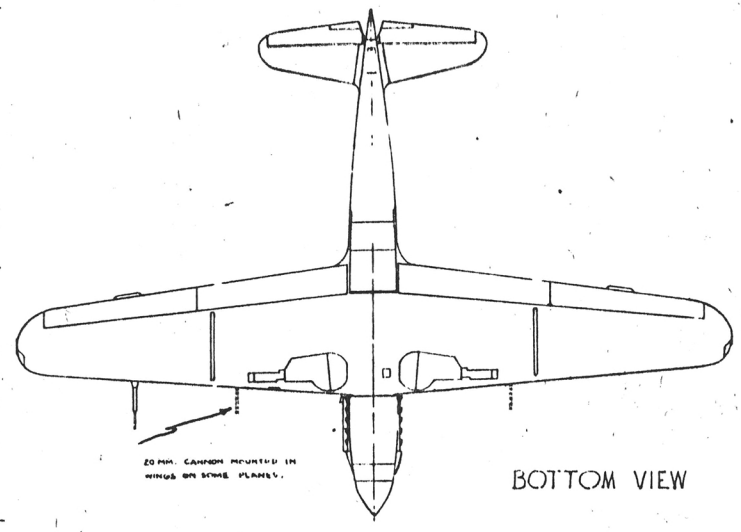
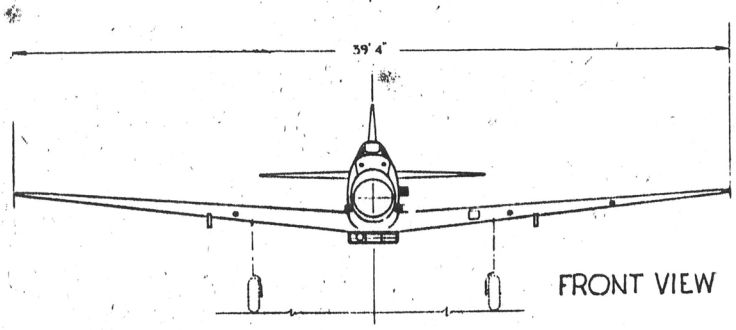
# TONY 2



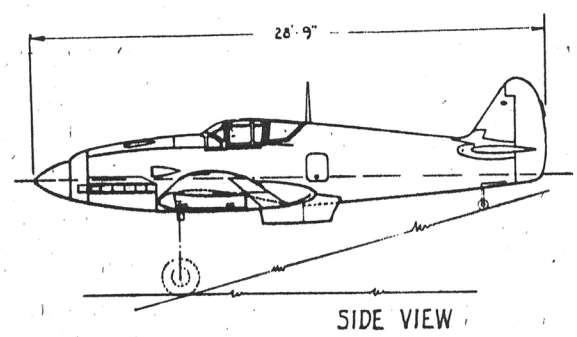

TOP VIEW



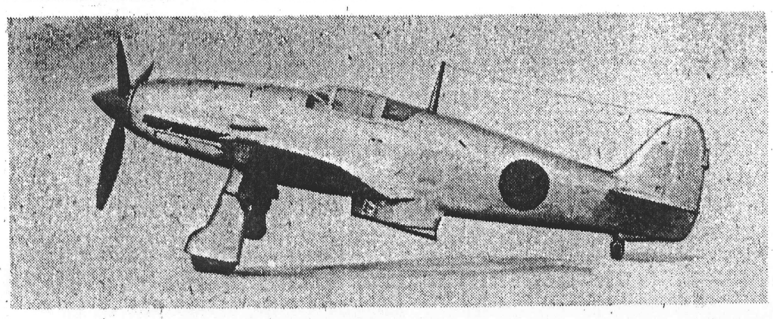

BOTTOM VIEW

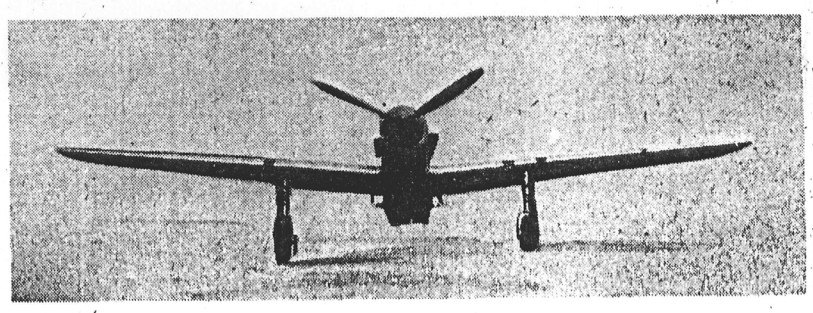


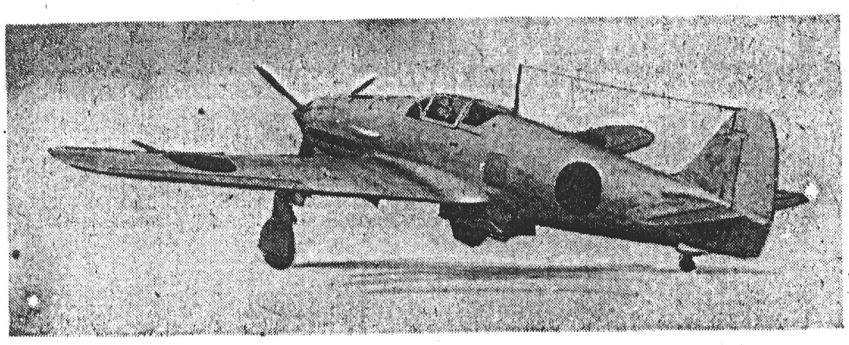

FRONT VIEW




SIDE VIEW







**RESTRICTED**

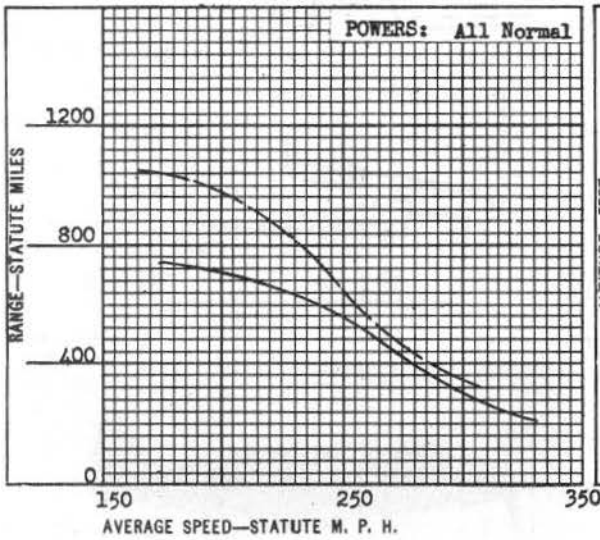
**DATE** March 1945

# TOJO 2

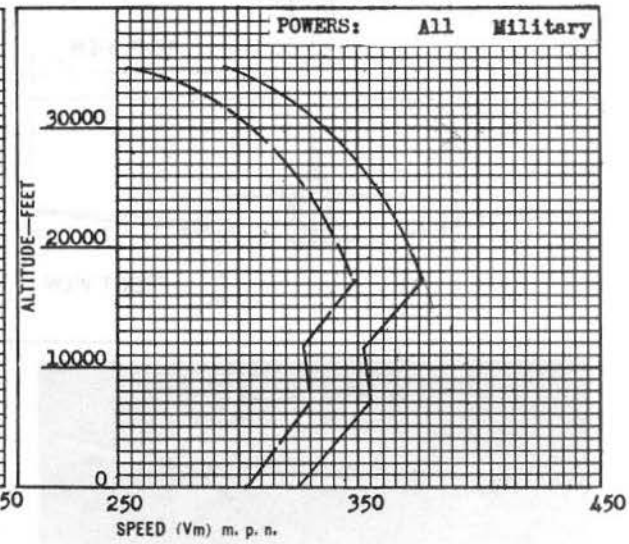
## RANGE * SPEED * CLIMB

| KEY | CONDITION | WEIGHT (lb.) | FUEL LOAD (lb.) | BOMBS—CARGO (lb.) |
|---|---|---|---|---|
| ——— | NORMAL FIGHTER | 6100 | 768 | None |
| — — — | OVERLOAD FIGHTER | 6610 | 1182 | None |

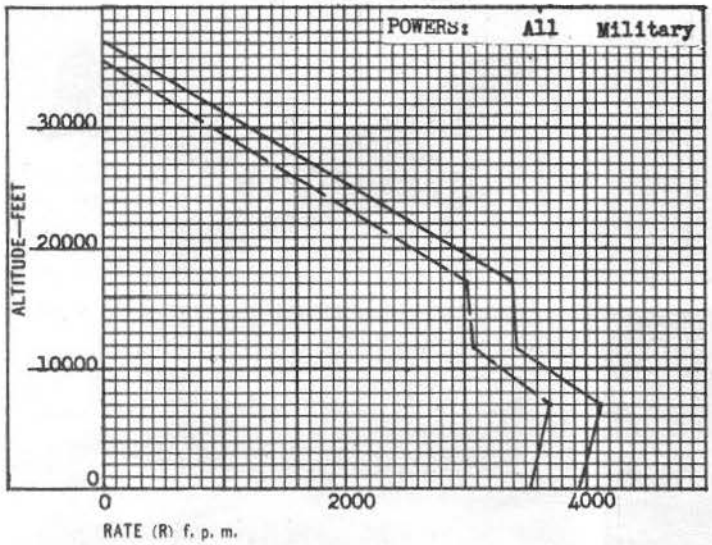
RANGE VS. SPEED



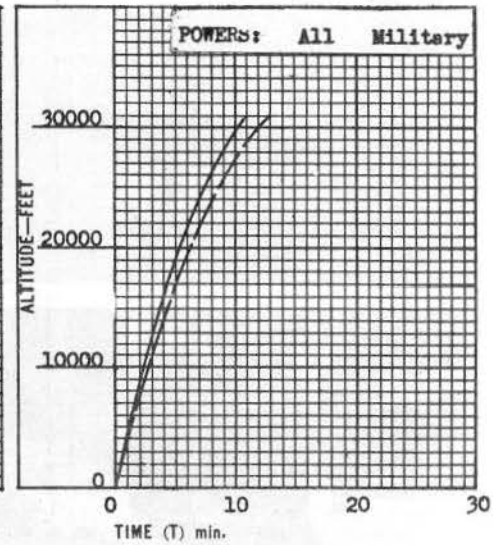

SPEED VS. ALTITUDE




RATE OF CLIMB




TIME TO ALTITUDE

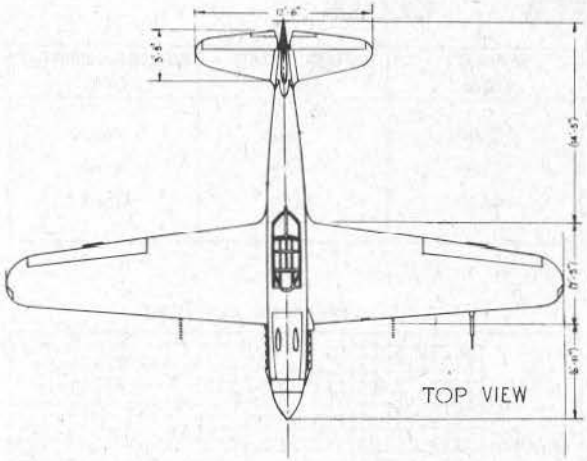


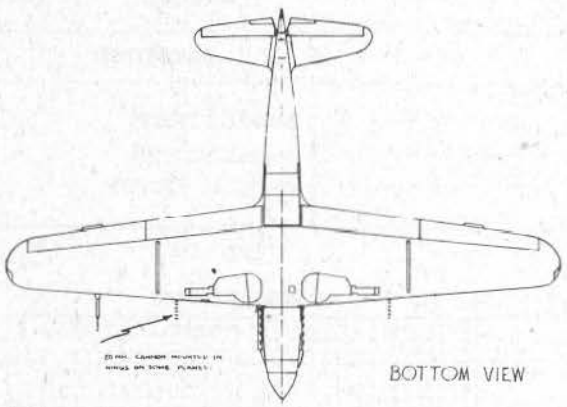

**DATE** December 1944

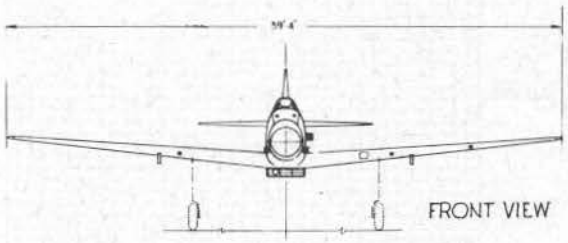
**RESTRICTED**

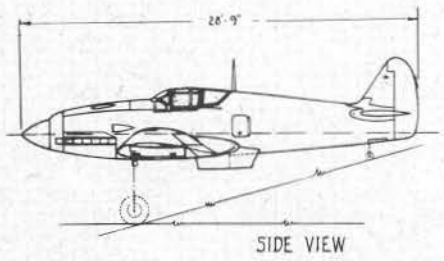
154B-4

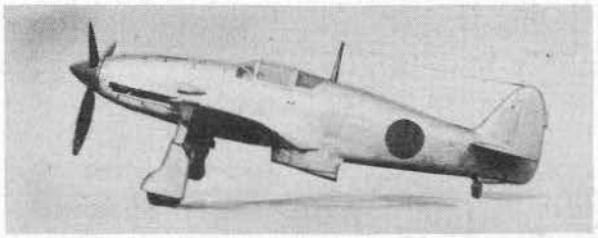
# TONY 2

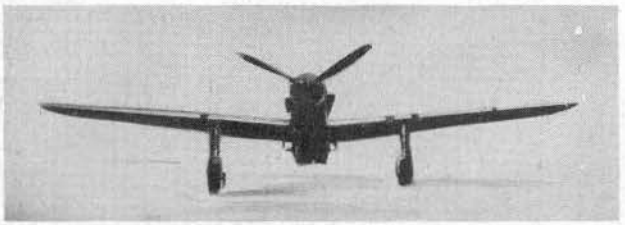




**RESTRICTED**

**DATE** March 1945

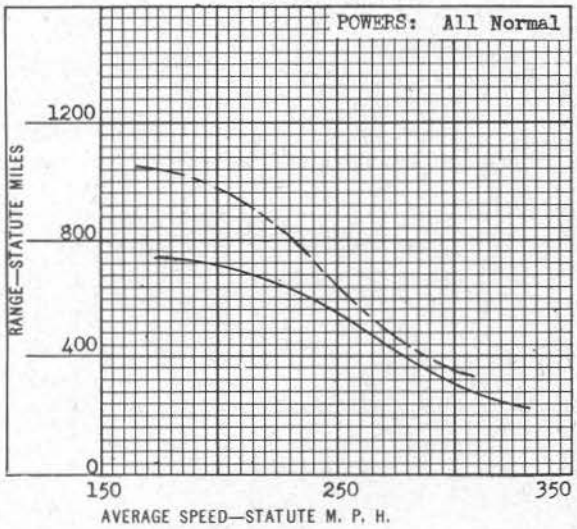
155A-1

# TOJO 2

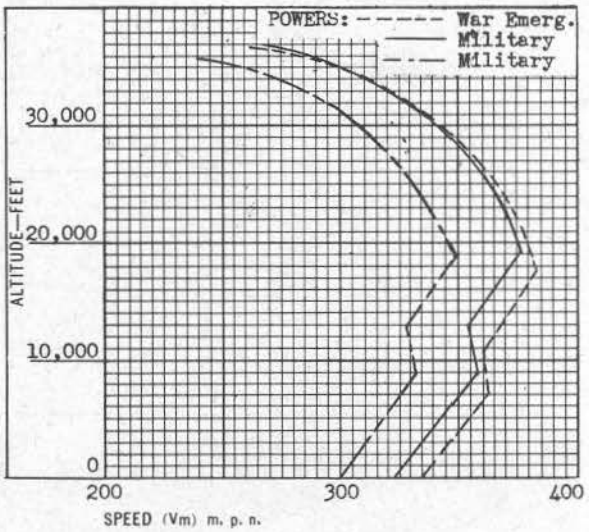
## RANGE * SPEED * CLIMB

| KEY | CONDITION | WEIGHT (lb.) | FUEL LOAD (lb.) | BOMBS—CARGO (lb.) |
|---|---|---|---|---|
| - - - - - - | NORMAL FIGHTER | 6100 | 768 | None |
| ——— | NORMAL FIGHTER | 6100 | 768 | None |
| —— - —— | OVERLOAD FIGHTER | 6610 | 1182 | None |

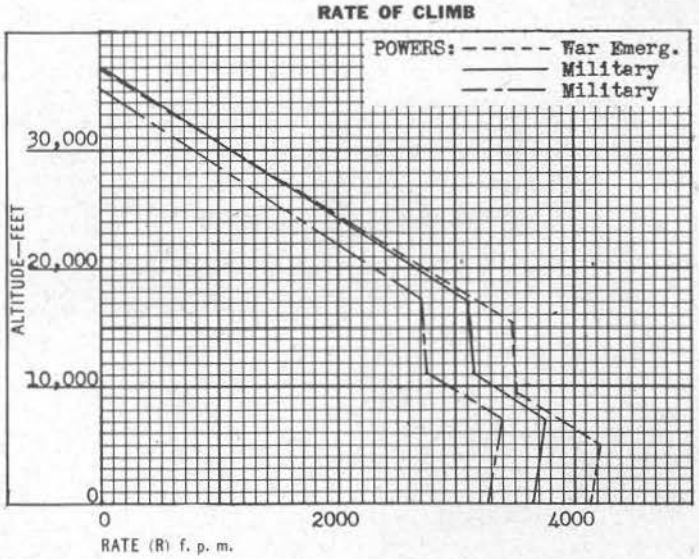
**RANGE VS. SPEED**



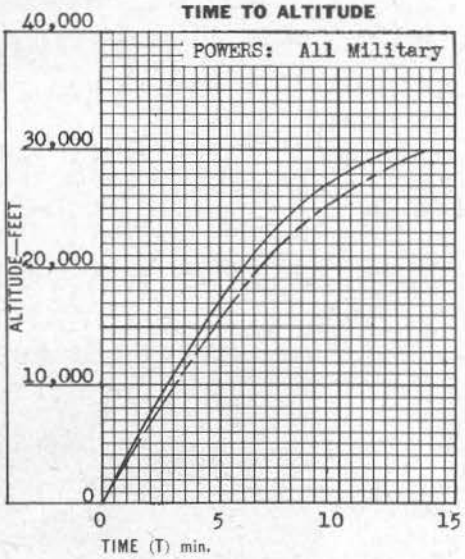

**SPEED VS. ALTITUDE**




**RATE OF CLIMB**




**TIME TO ALTITUDE**




**DATE** March 1945

**RESTRICTED**

# PERFORMANCE AND CHARACTERISTICS

# TOJO 2

## TAKE-OFF

| | Load | Feet |
|---|---|---|
| **Runway Requirements** | 6100 | 990 |
| T. O. over 50' obstacle | | |
| Landing over 50' obstacle | | |
| * T.O. + 100% | | |

## CLIMB—CEILING

| @ 6100 lbs. | Feet | Min. |
|---|---|---|
| Rate @ S. L. | 3640 | 1 |
| Rate @ 7000 ft. | 4220 | 1 |
| Time to 10,000' | | 2.8 |
| Time to 20,000' | | 6.0 |
| Service ceiling 36,350' | | |

## AIRCRAFT

Duty Fighter

Designation Type 2, Model 2 Ki 44

Description Low-wing Monoplane

Mfg. Nakajima

Engines 1 Crew 1

Construction All Metal

## SPEED

| @ 6100 lbs. | Mph. | Knts. | Altitude |
|---|---|---|---|
| Maximum WE | 335 | 291 | @ S. L. |
| Maximum WE | 383 | 332 | @ 17,400' |
| Cruising | | | |
| Economical | | | |

## BOMBS—CARGO

| | No. Size | Total Lbs. |
|---|---|---|
| Normal | None | |
| Maximum | | |

## ENGINES

| | H. P. | Altitude |
|---|---|---|
| Take-off WE | 1500 | S.L. |
| Normal | | |
| Military | 1420 | 7000' |
| | 1300 | 17200' |
| War Emerg. | 1570 | 5000' |

Mfg. Nakajima

Model Type 2, 1450 HP

Type Radial

Cylinders 14 Cooling Air

Supercharger 2 Speed

Propeller 3 Blade C.S. Diam. 10'

Fuel—Take-off 92 Cruising 92 Plus methanol

## WEIGHTS

| | Lbs. |
|---|---|
| Empty | 4300 |
| Gross | 6100 |
| Overload | 6610 |

## FUEL

| | U.S. gal. | Imp. gal. |
|---|---|---|
| Built-in | 128 | 106 |
| Internal (Removable) | • | |
| External (drop) | 69 | 57 |
| Maximum | 197 | 163 |

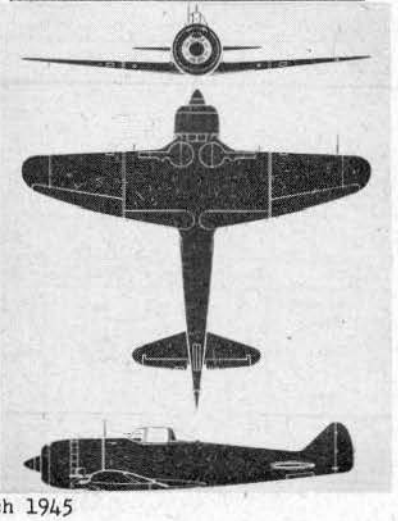
## RANGE AND RADIUS

| | Miles | | Speed | | Alt. feet | Fuel gal. | | Bombs lbs. | Cargo lbs. |
|---|---|---|---|---|---|---|---|---|---|
| | stat. | naut. | mph. | Knts. | | U. S. | Imp. | | |
| Maximum range (maximum fuel) | 1050 | 912 | 166 | 144 | 1500 | 197 | 163 | None | None |
| At 75% Vmax. | 810 | 703 | 230 | 200 | 1500 | 197 | 163 | None | None |
| Maximum range (normal fuel) | 740 | 643 | 174 | 151 | 1500 | 128 | 106 | None | None |
| At 75% Vmax. | 565 | 490 | 248 | 215 | 1500 | 128 | 106 | None | None |
| Radius ( ) | | | | | | | | | |
| Radius ( ) | | | | | | | | | |

## DIMENSIONS

Span 31' Length 29.2'

Height 10.6' Wing area 169 sq. ft.



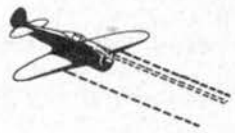
## GENERAL DATA

A small compact aircraft that is a pronounced departure from previous Japanese design. Has an exceptional rate of climb and a high diving speed. One series was constructed with 40 mm wing cannon.

155A-3

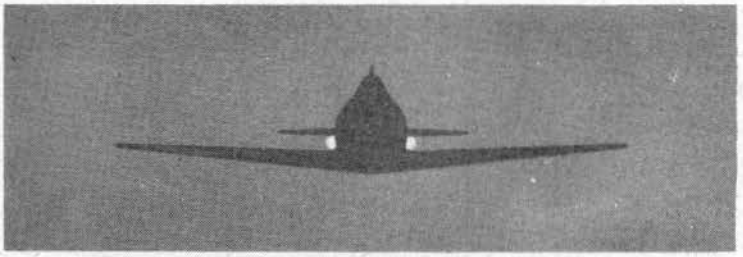
# TOJO 2

## FIELDS OF FIRE



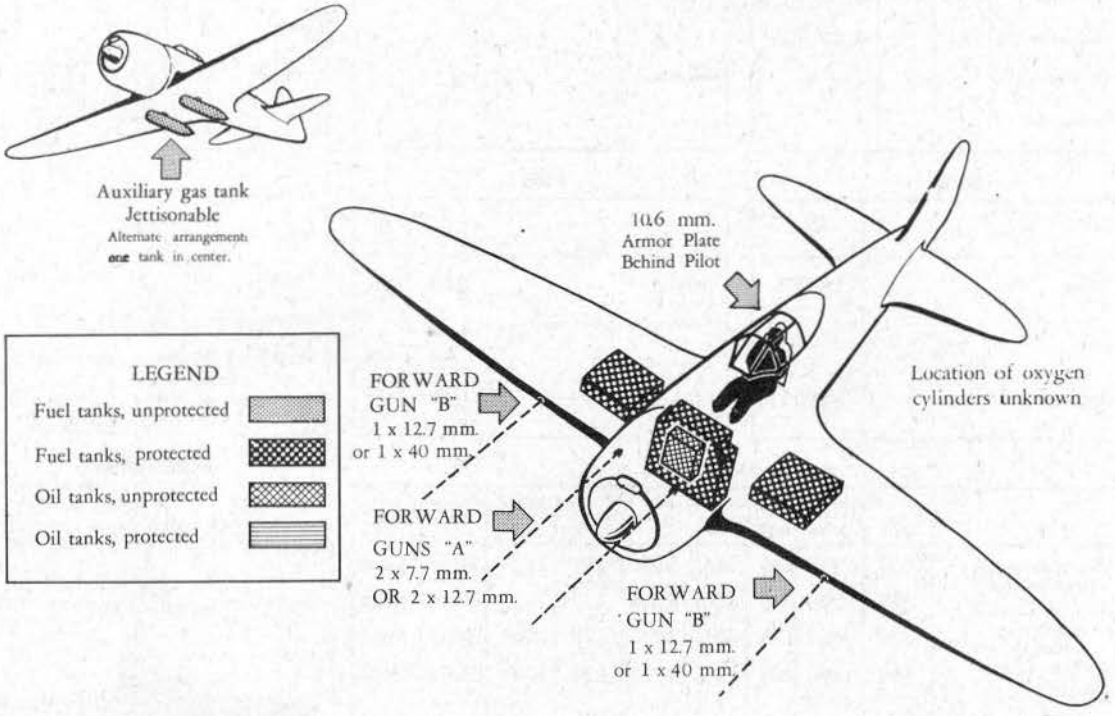
FORWARD GUNS
"A", AND "B"
¾-front view from above

## EXHAUST FLAME PATTERNS



REAR VIEW

## VULNERABILITY




### ARMAMENT

| | No. | Size | Rds. Gun | Type | | No. | Size | Rds. Gun | Type |
|---|---|---|---|---|---|---|---|---|---|
| Forward Cowl | 2 | 7.7 mm or | 500 | Fixed | Tail | | | | |
| Top | 2 | 12.7 mm | 250 | Fixed | Wing | 2 | 12.7 mm or | 250 | Fixed |
| Side | | | | | | 2 | 40 mm | 10(?) | Fixed |
| Bottom | | | | | | | | | |

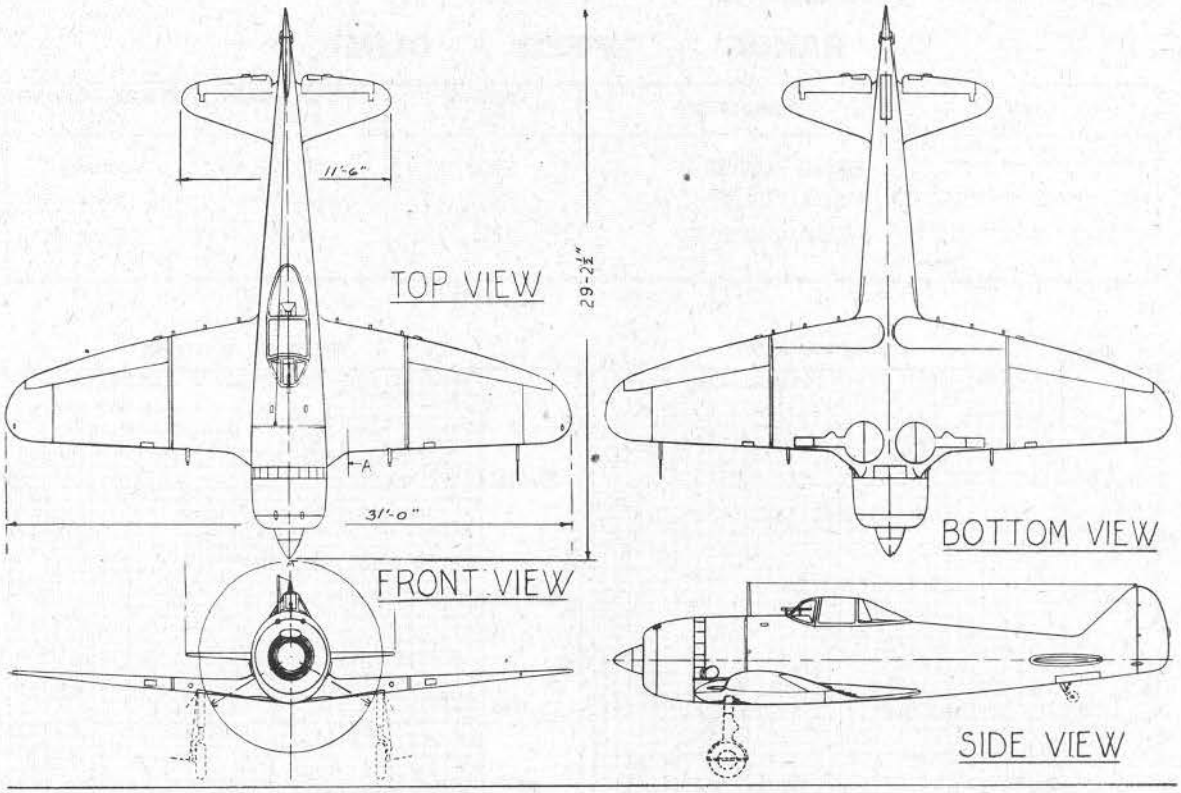
### TACTICAL DATA

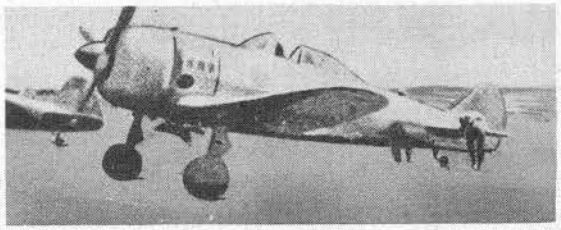
TOJO is restricted against snap rolls, spins, stalls and inverted flight at high speeds. This plane is equipped with armor plate behind the pilot and self sealing fuel tanks ineffective against .50 calibre fire.

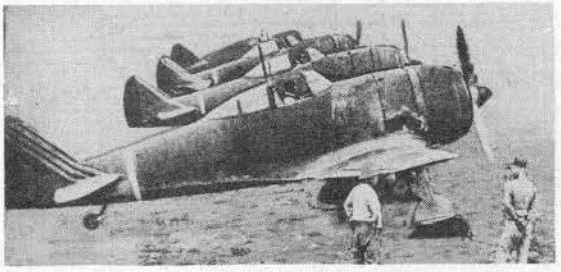
**DATE** March 1945

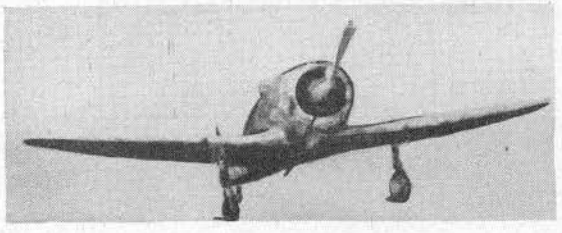
**RESTRICTED**

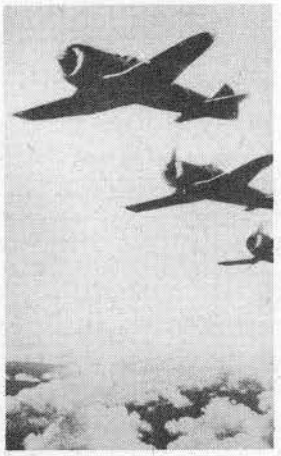
# TOJO 2

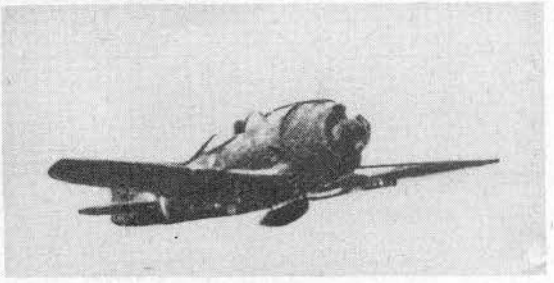










**RESTRICTED**

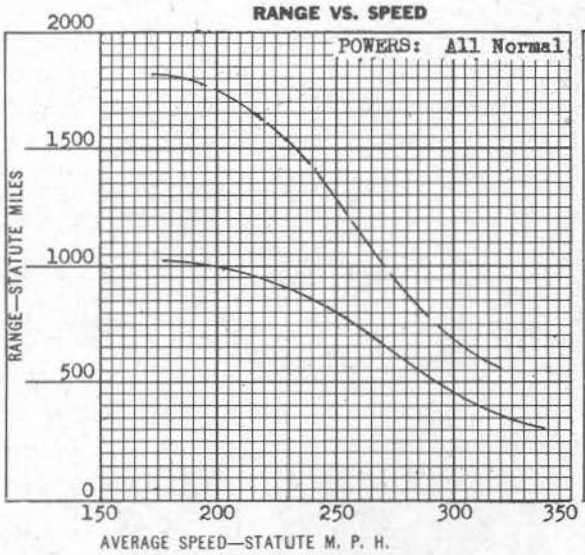
**DATE** December 1944

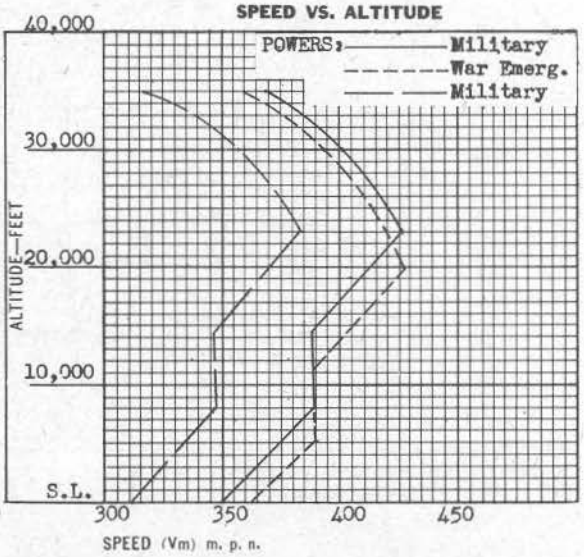
156A-1

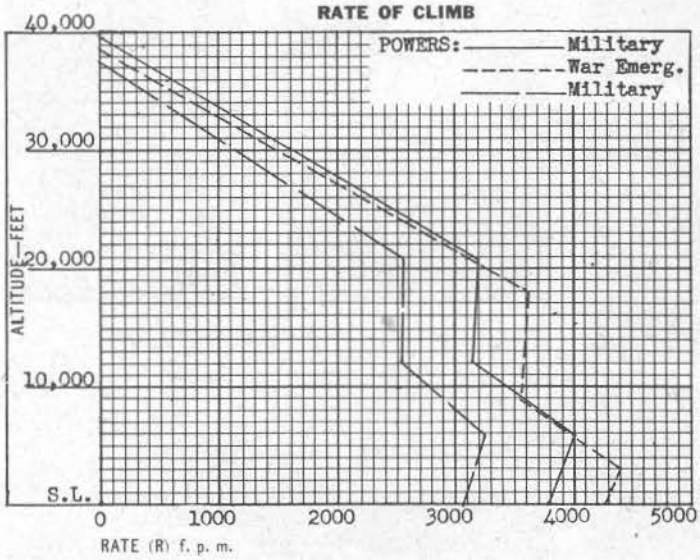
# FRANK 1

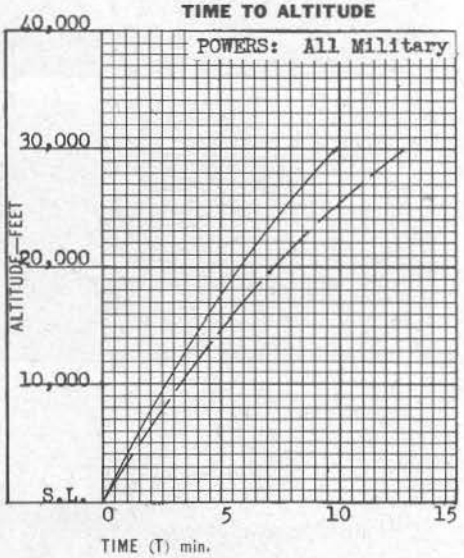
## RANGE * SPEED * CLIMB

| KEY | CONDITION | WEIGHT (lb.) | FUEL LOAD (lb.) | BOMBS—CARGO (lb.) |
|---|---|---|---|---|
| ——— | NORMAL FIGHTER | 7940 | 1110 | None |
| - - - - - - - - - - - | NORMAL FIGHTER | 7940 | 1110 | None |
| ——— ——— ——— | OVERLOAD FIGHTER | 9194 | 2088 | None |




**DATE** March 1945

**RESTRICTED**

# PERFORMANCE AND CHARACTERISTICS

# FRANK 1

## TAKE-OFF

| | Load | Feet |
|---|---|---|
| **Runway Requirements** | 7940 | 1460 |
| T. O. over 50' obstacle | | |
| Landing over 50' obstacle | | |
| * T.O. - 100% | | |

## CLIMB—CEILING

| @ 7940 lbs. | Feet | Min. |
|---|---|---|
| Rate @ S. L. | 3790 | 1 |
| War Emerg. | 4275 | 1 |
| Rate @ 20900 ft. | 3195 | 1 |
| WE @ 17900' | 3615 | 1 |
| Time to 10000' | | 2.6 |
| Time to 20000' | | 5.8 |
| 30000' | | 10.6 |
| Service ceiling 38,800' | | |

## AIRCRAFT

Duty Fighter

Designation Ki 84

Description Low-wing Monoplane

Mfg. Nakajima

Engines 1 Crew 1

Construction All Metal

## SPEED

| @ 7940 lbs. | Mph. | Knts. | Altitude |
|---|---|---|---|
| Maximum | 350 | | @ S. L. |
| W.E.P. | 363 | | @ S.L. |
| Maximum | 426 | | @ 23,000' |
| W.E.P. | 427 | | @ 20,000' |
| Cruising 75% | 254 | | @ 1,500' |
| Economical | | | |

## BOMBS—CARGO

| | No. | Size | Total Lbs. |
|---|---|---|---|
| Normal | None | | |
| Maximum | 2 | 30 kg | 132 |

## ENGINES

| | H. P. | Altitude |
|---|---|---|
| Take-off | 1970 | S.L. |
| | 2040 | 3,000' |
| Normal | 1850 | 17,900' |
| Military | (1765 | (S.L. |
| | (1875 | (5,900' |
| War Emerg. | (1695 | (20,000' |
| | 1850 | 17,900' |

Mfg. Nakajima

Model Ha 45 Model 21

Type Radial

Cylinders 18 Cooling Air

Supercharger 2 Speed

Propeller 4-Blade Diam. 10.16'
C.S. Electric

Fuel—Take-off 92 Cruising 92
(Plus methanol)

## WEIGHTS

| | Lbs. |
|---|---|
| Empty | |
| Gross | 7940 |
| Overload | 9194 |

## FUEL

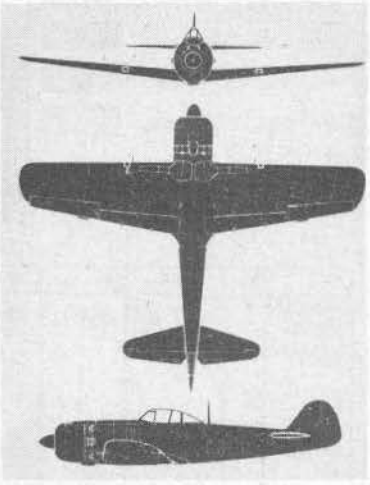
| | U.S. gal. | Imp. gal. |
|---|---|---|
| Built-in | 185 | 154 |
| Internal (Removable) | | |
| External (drop) | 174 | 144 |
| Maximum | 359 | 298 |

## RANGE AND RADIUS

| | Miles | | Speed | | Alt. feet | Fuel gal. | | Bombs lbs. | Cargo lbs. |
|---|---|---|---|---|---|---|---|---|---|
| | stat. | naut. | mph. | Knts. | | U. S. | Imp. | | |
| Maximum range (maximum fuel) | 1815 | 1575 | 173 | 150 | 1500 | 359 | 298 | None | None |
| | 1410 | 1225 | 241 | 209 | 1500 | 359 | 298 | None | None |
| Maximum range (normal fuel) | 1025 | 890 | 178 | 155 | 1500 | 185 | 154 | None | None |
| | 780 | 677 | 254 | 221 | 1500 | 185 | 154 | None | None |
| Radius ( ) | | | | | | | | | |
| Radius ( ) | | | | | | | | | |

## DIMENSIONS

Span 37.1' Length 32.32'
Height 11.17' Wing area 226 sq. ft.



## GENERAL DATA

RESTRICTED

DATE March 1945

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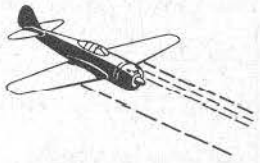
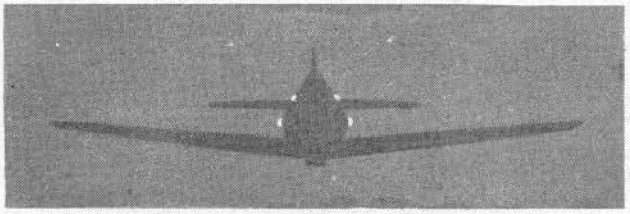
# FRANK 1

## FIELDS OF FIRE



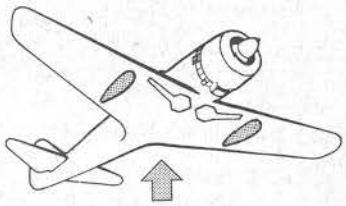
FORWARD GUNS "A", AND "B"
¾-front view from above

## EXHAUST FLAME PATTERNS

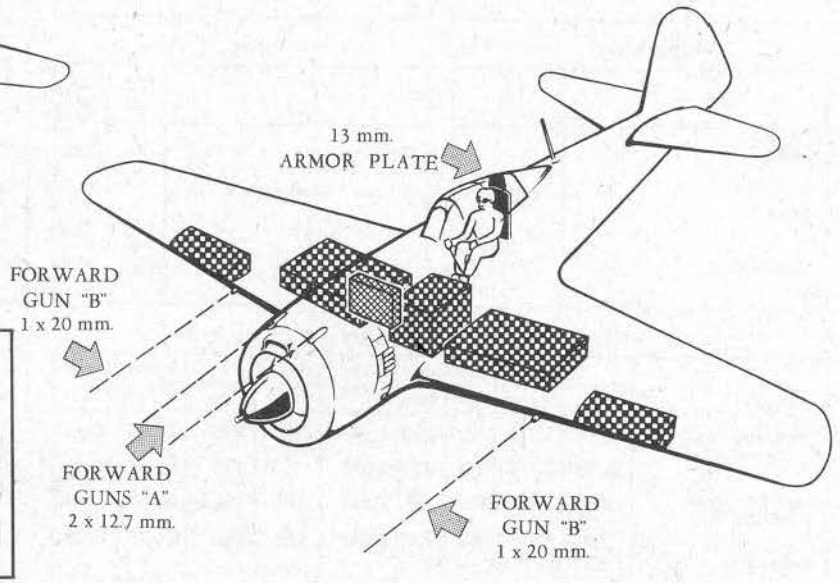


REAR VIEW

## VULNERABILITY



Auxiliary gas tank
Jettisonable




LEGEND

- Fuel tanks, unprotected
- Fuel tanks, protected
- Oil tanks, unprotected
- Oil tanks, protected

### ARMAMENT

| | No. | Size | Rds. Gun | Type | | No. | Size | Rds. Gun | Type |
|---|---|---|---|---|---|---|---|---|---|
| Forward Cowl | 2 | 12.7 mm | 350 | Fixed | Tail | | | | |
| Top | | | | | Wing | 2 | 20 mm | 150 | Fixed |
| Side | | | | | | | | | |
| Bottom | | | | | | | | | |

### TACTICAL DATA

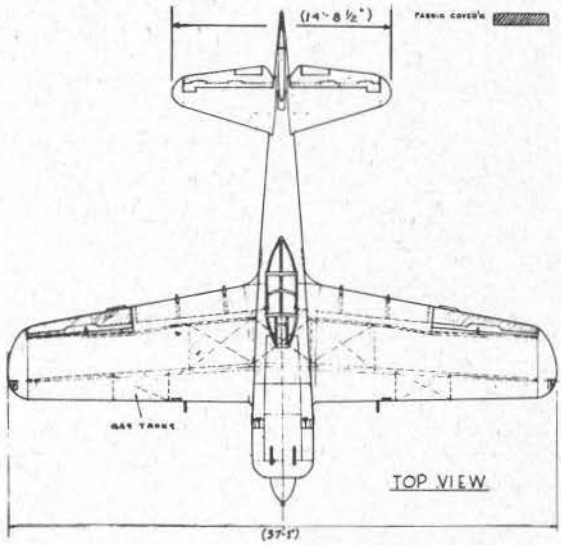
Documents state that FRANK has a bullet-proof windshield 65 mm thick. Armor plate is provided for pilot's back and head.

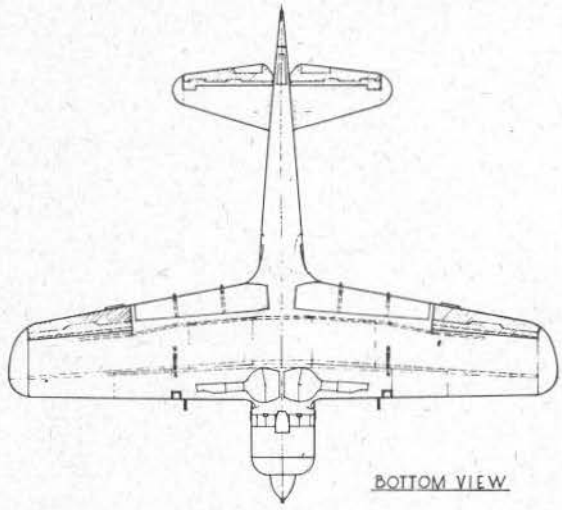
**DATE** March 1945

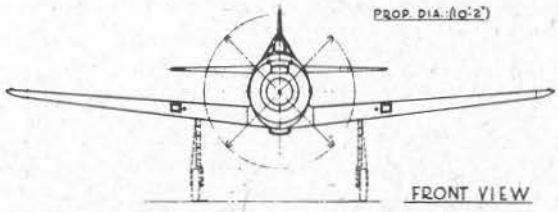
**RESTRICTED**

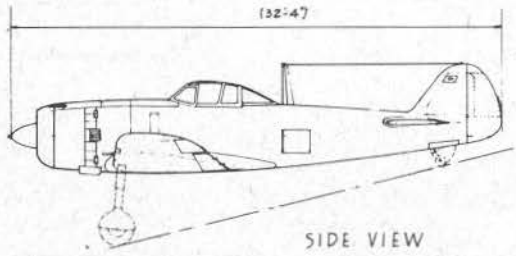
**156A-4**

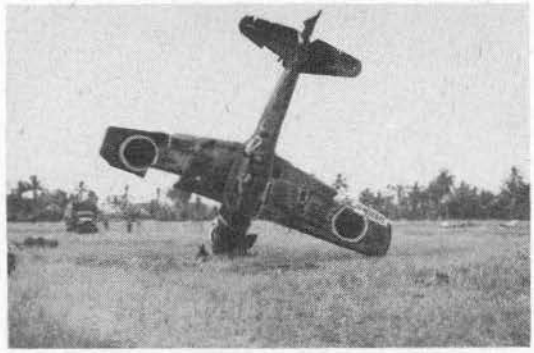
# FRANK 1



**RESTRICTED**

**DATE** March 1945

# ROB 1

Vulnerability, Fields of Fire, etc.

**ARMAMENT**

| | No. | Size | Rds. Gun | Type | | No. | Size | Rds. Gun | Type |
|---|---|---|---|---|---|---|---|---|---|
| Forward | | | | | Tail | | | | |
| Top | | | | | Wing | | | | |
| Side | | | | | | | | | |
| Bottom | | | | | | | | | |

**TACTICAL DATA**

No information.

**DATE** December 1944

**RESTRICTED**

# PERFORMANCE AND CHARACTERISTICS

# ROB 1

## TAKE-OFF

| | Load | Feet |
|---|---|---|
| T.O. calm | | |
| T.O. 25 kt. wind | | |
| T.O. over 50' obstacle | | |
| Landing over 50' obstacle | | |

## CLIMB—CEILING

| @ lbs. | Feet | Min. |
|---|---|---|
| Rate @ S.L. | | |
| Rate @ ft. | | |
| Time to | | |
| Time to | | |
| Service ceiling | | |

## AIRCRAFT

Duty High Speed Fighter

Designation Ki 64

Description In-line Engine Fighter

Mfg. Kawasaki

Engines 2 Crew 1

Construction

## SPEED

| @ lbs. | Mph. | Knts. | Altitude |
|---|---|---|---|
| Maximum | | | @ S. L. |
| Maximum | | | @ |
| Cruising | | | |
| Economical | | | |

## BOMBS—CARGO

| | No. Size | Total Lbs. |
|---|---|---|
| Normal | | |
| Maximum | | |

## ENGINES

| | H. P. | Altitude |
|---|---|---|
| Take-off | | |
| Normal | | |
| Military | | |
| War Emerg. | | |

Mfg.

Model HA 201

Type

Cylinders Cooling

Supercharger

Propeller Diam.

Fuel - Take-off Cruising

## WEIGHTS

| | Lbs. |
|---|---|
| Empty | |
| Gross | |
| Overload | |

## FUEL

| | U.S. gal. | Imp. gal. |
|---|---|---|
| Built-in | | |
| Internal (Removable) | | |
| External (drop) | | |
| Maximum | | |

## RANGE AND RADIUS

| | Miles | | Speed | | Alt. | Fuel gal. | | Bombs | Cargo |
|---|---|---|---|---|---|---|---|---|---|
| | stat. | naut. | mph. | Knts. | feet | U. S. | Imp. | lbs. | lbs. |
| Maximum range (maximum fuel) | | | | | | | | | |
| Maximum range (normal fuel) | | | | | | | | | |
| Radius ( ) | | | | | | | | | |
| Radius ( ) | | | | | | | | | |

## DIMENSIONS

Span Length

Height Wing area sq.ft.

## GENERAL DATA

ROB 1 is reputed to be a high speed fighter made by Kawasaki with a Ha 201 in-line engine, a tandem arrangement probably composed of two modified DB engines (Jap version). The nose should be very pronounced and much more distinctive than those of either the Army fighter TONY or the Navy dive bomber JUDY, the only other Jap combat aircraft with inline engines at present. Exceptionally high speed is attributed.

# STEVE 1

Vulnerability, Fields of Fire, etc.

ARMAMENT

| | No. | Size | Rds. Gun | Type | | No. | Size | Rds. Gun | Type |
|---|---|---|---|---|---|---|---|---|---|
| Forward | | | | | Tail | | | | |
| Top | | | | | Wing | | | | |
| Side | | | | | | | | | |
| Bottom | | | | | | | | | |

TACTICAL DATA

No information.

DATE December 1944

RESTRICTED

# PERFORMANCE AND CHARACTERISTICS

# STEVE 1

## TAKE-OFF

| | Load | Feet |
|---|---|---|
| T.O. calm | | |
| T.O. 25 kt. wind | | |
| T.O. over 50' obstacle | | |
| Landing over 50' obstacle | | |

## CLIMB—CEILING

| @ lbs. | Feet | Min. |
|---|---|---|
| Rate @ S.L. | | |
| Rate @ ft. | | |
| Time to | | |
| Time to | | |
| Service ceiling | | |

## AIRCRAFT

Duty High Speed Fighter

Designation Ki 73

Description

Mfg.

Engines Crew

Construction

## SPEED

| @ lbs. | Mph. | Knts. | Altitude |
|---|---|---|---|
| Maximum | | | @ S. L. |
| Maximum | | | @ |
| Cruising | | | |
| Economical | | | |

## BOMBS—CARGO

| | No. | Size | Total Lbs. |
|---|---|---|---|
| Normal | | | |
| Maximum | | | |

## ENGINES

| | H. P. | Altitude |
|---|---|---|
| Take-off | 1970 | S.L. |
| Normal | | |
| Military | 1825<br>1665 | 4,590'<br>16,400' |
| War Emerg. | 2040 | 3,100' |

Mfg. Mitsubishi

Model HA 42, Model 11

Type Radial

Cylinders 18 Cooling Air Fan assisted

Supercharger 2 Speed

Propeller Diam.

Fuel - Take-off 92 Cruising 92

## WEIGHTS

| | Lbs. |
|---|---|
| Empty | |
| Gross | |
| Overload | |

## FUEL

| | U.S. gal. | Imp. gal. |
|---|---|---|
| Built-in | | |
| Internal (Removable) | | |
| External (drop) | | |
| Maximum | | |

## RANGE AND RADIUS

| | Miles | | Speed | | Alt. feet | Fuel gal. | | Bombs lbs. | Cargo lbs. |
|---|---|---|---|---|---|---|---|---|---|
| | stat. | naut. | mph. | Knts. | | U. S. | Imp. | | |
| Maximum range (maximum fuel) | | | | | | | | | |
| Maximum range (normal fuel) | | | | | | | | | |
| Radius ( ) | | | | | | | | | |
| Radius ( ) | | | | | | | | | |

## DIMENSIONS

Span Length

Height Wing area sq.ft.

## GENERAL DATA

STEVE 1 is a Type 3 "super high speed fighter" whose production status is not known. No recognition or performance data is available at present. Based on its type 3 designation, however, it may be nearing an operational stage. Speed and rate of climb should be comparable to FRANK 1.

**RESTRICTED** Provisional Data **DATE** December 1944

159A-1

# PAT 1

Vulnerability, Fields of Fire, etc.

**ARMAMENT**

| | No. | Size | Rds. Gun | Type | | No. | Size | Rds. Gun | Type |
|---|---|---|---|---|---|---|---|---|---|
| Forward | | | | | Tail | | | | |
| Top | | | | | Wing | | | | |
| Side | | | | | | | | | |
| Bottom | | | | | | | | | |

**TACTICAL DATA**

No information.

**DATE** December 1944

**RESTRICTED**

# PERFORMANCE AND CHARACTERISTICS

# PAT 1

## TAKE-OFF

| | Load | Feet |
|---|---|---|
| T.O. calm | | |
| T.O. 25 kt. wind | | |
| T.O. over 50' obstacle | | |
| Landing over 50' obstacle | | |

## CLIMB—CEILING

| @ lbs. | Feet | Min. |
|---|---|---|
| Rate @ S.L. | | |
| Rate @ ft. | | |
| Time to | | |
| Time to | | |
| Service ceiling | | |

## AIRCRAFT

Duty Long Range Fighter

Designation Ki 74

Description

Mfg. Tachikawa

Engines Crew

Construction

## SPEED

| @ lbs. | Mph. | Knts. | Altitude |
|---|---|---|---|
| Maximum | | | @ S. L. |
| Maximum | | | @ |
| Cruising | | | |
| Economical | | | |

## BOMBS—CARGO

| | No. Size | Total Lbs |
|---|---|---|
| Normal | | |
| Maximum | | |

## ENGINES

| | H. P. | Altitude |
|---|---|---|
| Take-off | | |
| Normal | | |
| Military | | |
| War Emerg. | | |

Mfg.

Model HA 221

Type

Cylinders Cooling

Supercharger

Propeller Diam.

Fuel - Take-off Cruising

## WEIGHTS

| | Lbs. |
|---|---|
| Empty | |
| Gross | |
| Overload | |

## FUEL

| | U.S. gal. | Imp. gal. |
|---|---|---|
| Built-in | | |
| Internal (Removable) | | |
| External (drop) | | |
| Maximum | | |

## RANGE AND RADIUS

| | Miles stat. | Miles naut. | Speed mph. | Speed Knts. | Alt. feet | Fuel gal. U. S. | Fuel gal. Imp. | Bombs lbs. | Cargo lbs. |
|---|---|---|---|---|---|---|---|---|---|
| Maximum range (maximum fuel) | | | | | | | | | |
| Maximum range (normal fuel) | | | | | | | | | |
| Radius (' ) | | | | | | | | | |
| Radius ( ) | | | | | | | | | |

## DIMENSIONS

Span Length

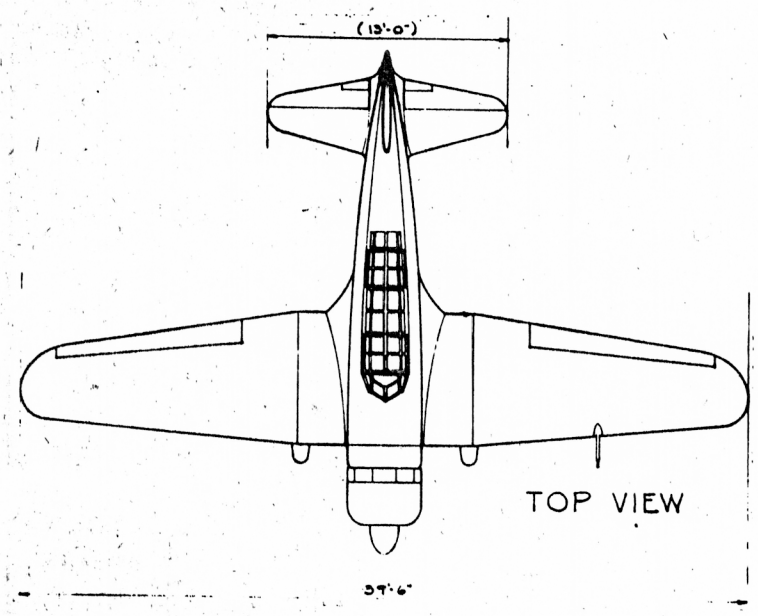
Height Wing area sq.ft.

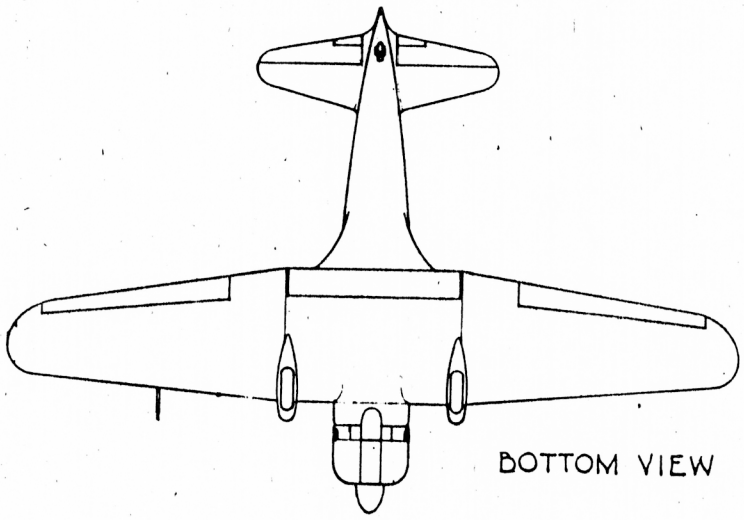
## GENERAL DATA

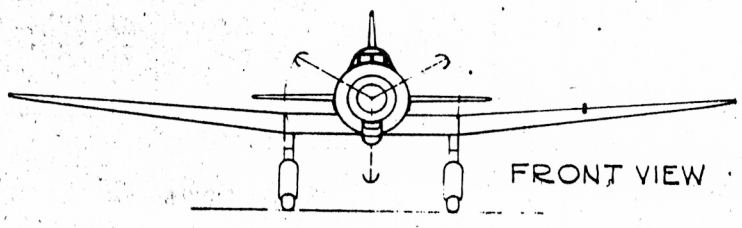
PAT 1 (Ki 74) is listed as a "super range, high speed fighter" probably intended for long range escort duty. It is designed by Tachikawa and is reported to be fitted with the Ha 221 engine - whether single or twin is not known. Performance data or stage of development are not known, but with the present tendency of the Japanese to stress defensive fighter types, it seems doubtful that much productive effort will be spent on PAT.

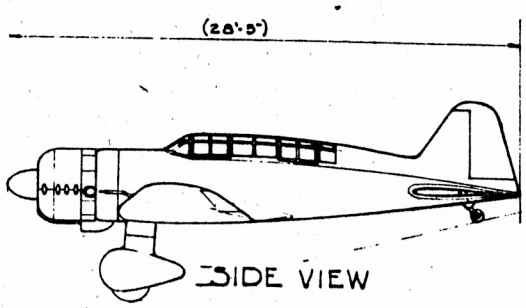
202A-1

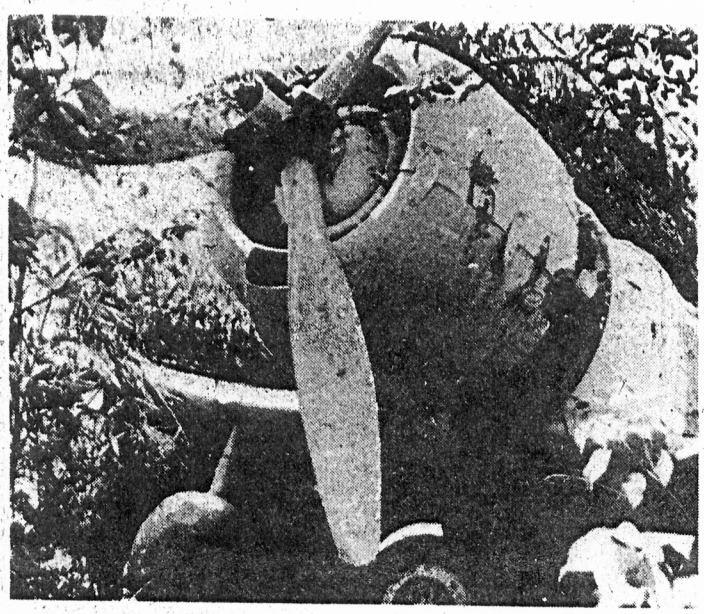
# BABS 12

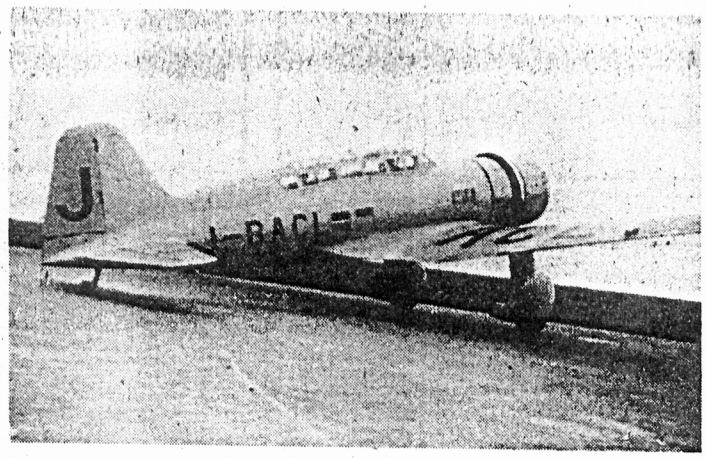


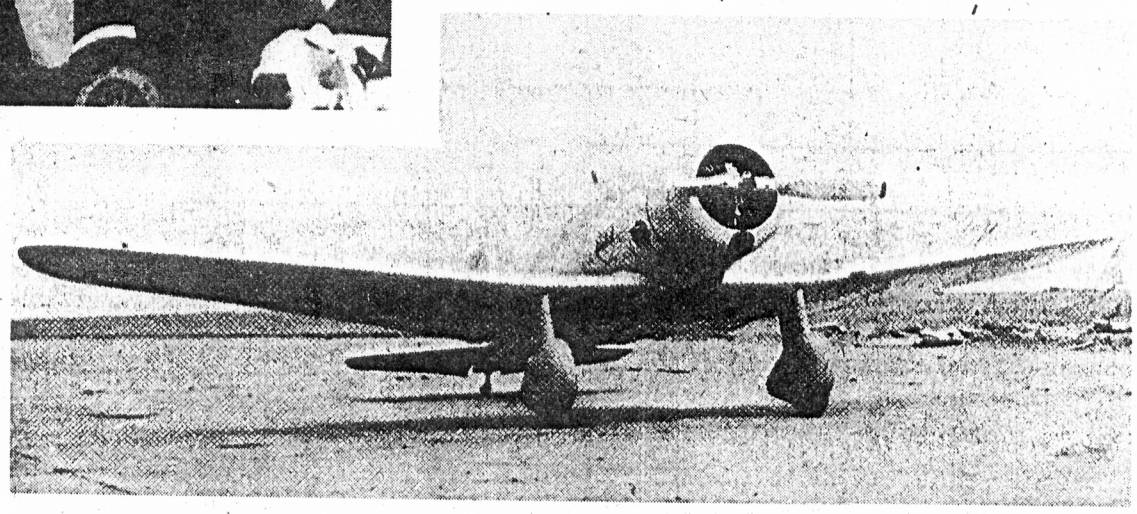







RESTRICTED

DATE July 1945

# PERFORMANCE AND CHARACTERISTICS

# BABS 12

## TAKE-OFF

| | Load | Feet |
|---|---|---|
| T.O. calm | | |
| T.O. 25 kt. wind | | |
| T.O. over 50' obstacle | | |
| Landing over 50' obstacle | | |

## CLIMB—CEILING

| @ lbs. | Feet | Min. |
|---|---|---|
| Rate @ S.L. | | |
| Rate @ ft. | | |
| Time to | | |
| Time to | | |
| Service ceiling | | |

## AIRCRAFT

Duty Land Based Recco

Designation Type 98 (C5M2)

Description Low-wing monoplane
Fixed Landing Gear

Mfg. Mitsubishi

Engines 1 Crew 2

Construction All Metal

## SPEED

| Suicide Condition | Mph. | Knts. | Altitude |
|---|---|---|---|
| Max. with 1x250 kg. bomb | 279 | 242 | @ 13,800' |
| Max. with 1x500 kg. bomb | 269 | 233 | @ 13,800' |
| Diving | 363 | 315 | |

## BOMBS—CARGO

| | No. Size | Total Lbs. |
|---|---|---|
| Maximum | 6 x 50 kg | 660 |
| (Suicide) | 1 x 500 kg | 1100 |

## ENGINES

| | H. P. | Altitude |
|---|---|---|
| Take-off | 925 | S.L. |
| Normal | 705 | 1500' |
| Military | 925 | S.L. |
| War Emerg. | 960 | 13,800' |

Mfg. Nakajima

Model Sakae 12 (Ha 35 Mod.12)

Type Radial

Cylinders 14 Cooling Air

Supercharger Single Speed

Propeller 3 blade Diam. 9.9'

Fuel - Take-off 87 Cruising 87

## WEIGHTS

| | Lbs. |
|---|---|
| Empty | 4320 |
| Gross | 5750 |
| Suicide Overload | |
| with 1 x 250 kg bomb | 5820 |
| with 1 x 500 kg bomb | 6325 |

## FUEL

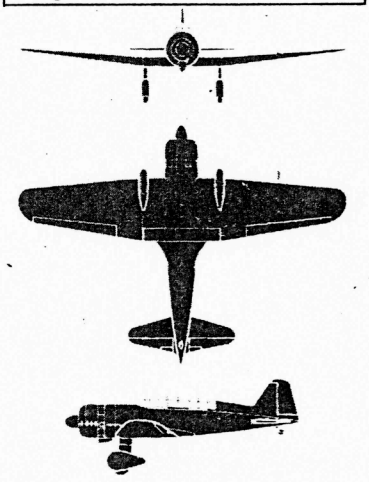
| | U.S. gal. | Imp. gal. |
|---|---|---|
| Built-in | 120 | 100 |
| Internal (Removable) | | |
| External (drop) | | |
| Maximum | 120 | 100 |

## RANGE AND RADIUS

| Suicide Condition | Miles | | Speed | | Alt. feet | Fuel gal. | | Bombs lbs. | Cargo lbs. |
|---|---|---|---|---|---|---|---|---|---|
| | stat. | naut. | mph. | Knts. | | U. S. | Imp. | | |
| Max. Range | 870 | 755 | 124 | 106 | 1500 | 120 | 100 | 550 | None |
| R @ Combat Cr. | 285 | 247 | 222 | 193 | 1500 | 120 | 100 | 550 | None |
| Max. Range | 740 | 643 | 124 | 106 | 1500 | 113 | 94 | 1100 | None |
| R @ Combat Cr. | 255 | 222 | 215 | 186 | 1500 | 113 | 94 | 1100 | None |

## DIMENSIONS

Span 39.5' Length 28.4'
Height 9'3" Wing area 237 sq.ft.



## GENERAL DATA

Suicide Conditions - The assumption is made that the above bomb loads can be secured to the aircraft internally

Armament - 2 x 7.7 mm Type 89 Fixed, in the wings.
1 x 7.7 mm Type 89 Flexible, in rear cockpit.

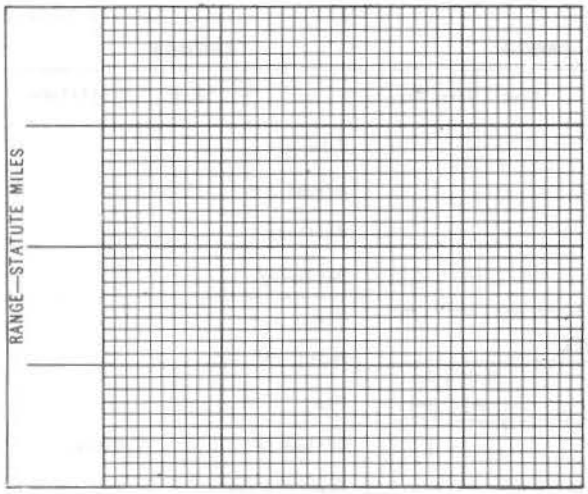
203A-1

# GLEN 11

## RANGE * SPEED * CLIMB

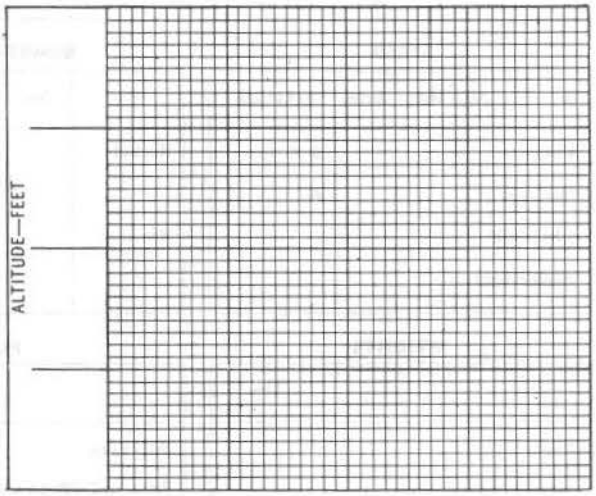
| KEY | CONDITION | WEIGHT (lb.) | FUEL LOAD (lb.) | BOMBS—CARGO (lb.) |
|---|---|---|---|---|
| | | | | |

**RANGE VS. SPEED**



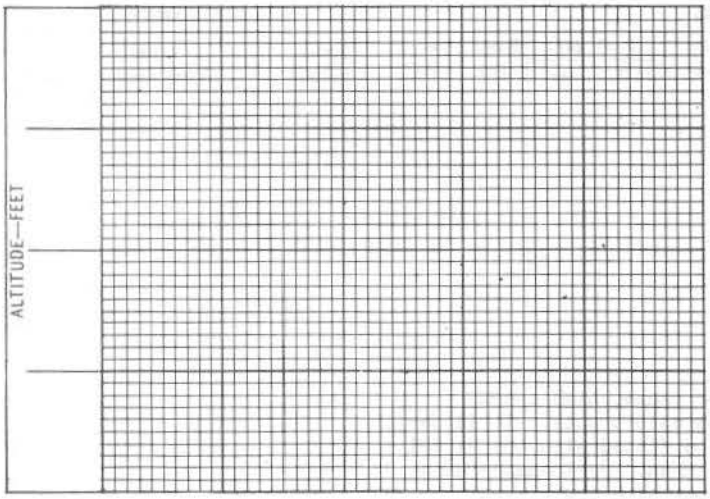

AVERAGE SPEED—STATUTE M. P. H.

**SPEED VS. ALTITUDE**



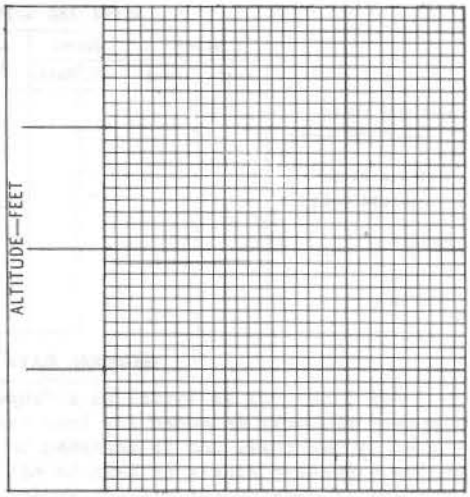

SPEED (Vm) m. p. n.

**RATE OF CLIMB**




RATE (R) f. p. m.

**TIME TO ALTITUDE**




TIME (T) min.

**DATE** December 1944

**RESTRICTED**

# PERFORMANCE AND CHARACTERISTICS

# GLEN 11

## TAKE-OFF

| | Load | Feet |
|---|---|---|
| T.O. calm | | |
| T.O. 25 kt. wind | | |
| T.O. over 50' obstacle | | |
| Landing over 50' obstacle | | |

## CLIMB—CEILING

| @ lbs. | Feet | Min. |
|---|---|---|
| Rate @ S.L. | | |
| Rate @ ft. | | |
| Time to | | |
| Time to | | |
| Service ceiling | | |

## AIRCRAFT

Duty Submarine Borne Recce Plane

Designation Type 0, Model 11

Description Low-wing Monoplane Twin float

Mfg. Yokosuka (?)

Engines 1 Crew 2

Construction Composite - Metal and Fabric

## SPEED

| @ lbs. | Mph. | Knts. | Altitude |
|---|---|---|---|
| Maximum | | | @ S. L. |
| Maximum | | | @ |
| Cruising 75% Max. | 92 | 80 | (?) |
| Diving Speed Economical | | 190 | |

## BOMBS—CARGO

| | No. | Size | Total Lbs. |
|---|---|---|---|
| Normal | | | |
| Maximum | | | |

## ENGINES

| | H. P. | Altitude |
|---|---|---|
| Take-off | 360 | S.L. |
| Normal | 300 | S.L. |
| Military | 205 | 13,123' |
| War Emerg. | | |

Mfg. Tokyo Gasu Denki

Model Amakaze Model 11

Type Radial

Cylinders 9 Cooling Air

Supercharger None

Propeller 2 Blade Diam. 8.2 Fixed Pitch

Fuel - Take-off Cruising

## WEIGHTS

| | Lbs. |
|---|---|
| Empty | 2392 |
| Gross | 3197 |
| Overload | 3527 |

## FUEL

| | U.S. gal. | Imp. gal. |
|---|---|---|
| Built-in | 89.8 | 75.5 |
| Internal (Removable) | | |
| External (drop) | | |
| Maximum | 89.8 | 75.5 |

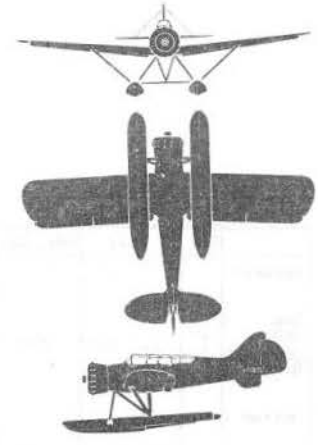
## RANGE AND RADIUS

| | Miles | | Speed | | Alt. feet | Fuel gal. | | Bombs lbs. | Cargo lbs. |
|---|---|---|---|---|---|---|---|---|---|
| | stat. | naut. | mph. | Knts. | | U. S. | Imp. | | |
| Maximum range (maximum fuel) | 500 | 435 | (approx.) | | | 89.8 | 75.5 | | |
| Maximum range (normal fuel) | | | | | | | | | |
| Radius ( ) | | | | | | | | | |
| Radius ( ) | | | | | | | | | |

## DIMENSIONS

Span 35.97' Length 28.01'

Height 12.09' Wing area sq.ft.



## GENERAL DATA

Scanty documentary information discloses GLEN 11 to be a submarine borne reconnaissance plane whose primary requirement is ease of disassembly and stowage at the sacrifice of performance.

Flimsy construction, low performance, and minimum armament make the value of this aircraft questionable.

Overload weight is maximum catapult weight.

# GLEN 11

Vulnerability, Fields of Fire, etc.

**ARMAMENT**

| | No. | Size | Rds. Gun | Type | | No. | Size | Rds. Gun | Type |
|---|---|---|---|---|---|---|---|---|---|
| Forward | | | | | Tail | | | | |
| Top Rear Cockpit Side | 1 | 7.7 mm | 290 | Flex. | Wing | | | | |
| Bottom | | | | | | | | | |

**TACTICAL DATA**

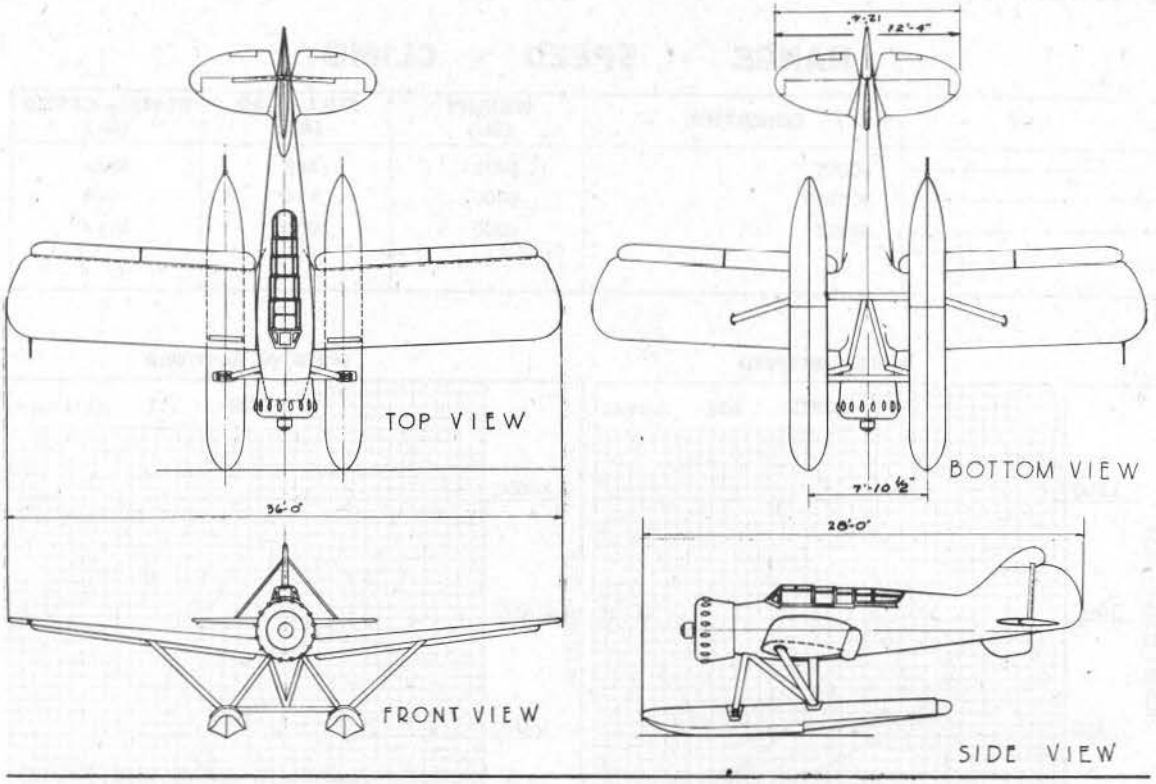
All major assemblies may be quickly dismantled.

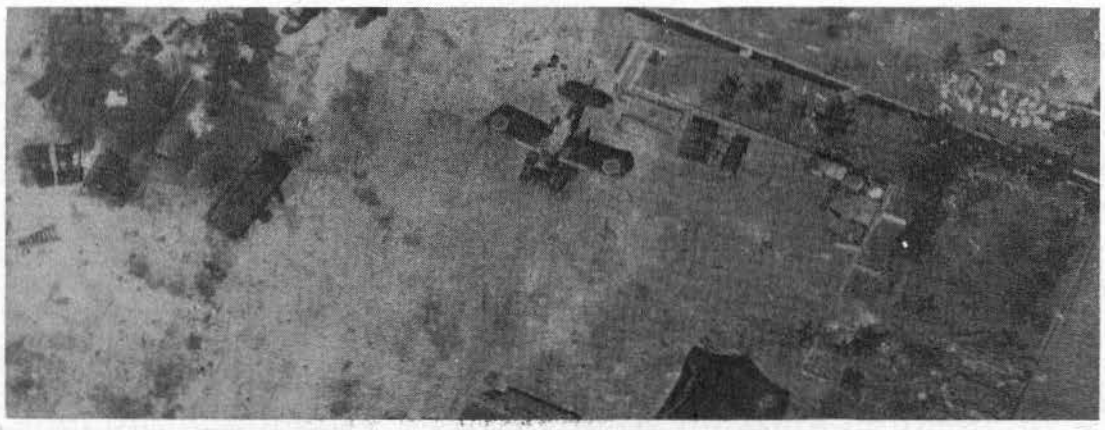
Gas tanks fit on top of wings and are faired into cockpit.

**DATE** December 1944

**RESTRICTED**

# GLEN 11





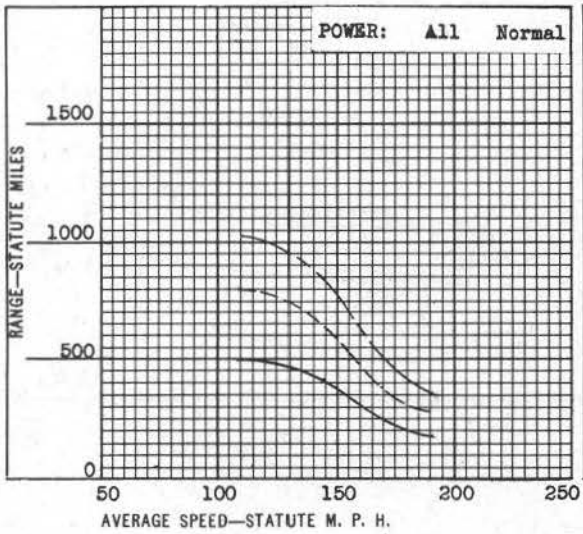
**DATE** December 1944

# PETE 11

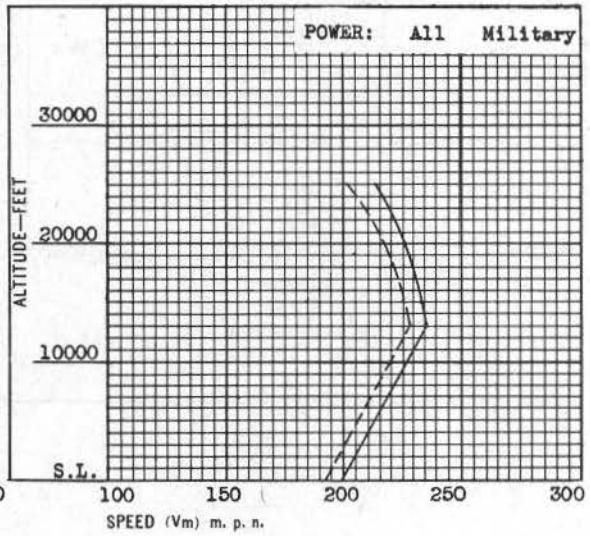
## RANGE • SPEED • CLIMB

| KEY | CONDITION | WEIGHT (lb.) | FUEL LOAD (lb.) | BOMBS—CARGO (lb.) |
|---|---|---|---|---|
| ——— | SCOUT | 5625 | 469 | None |
| – – – – – – | BOMBER | 6200 | 994 | 265 |
| ——— – ——— – | SCOUT | 6200 | 1000 | None |

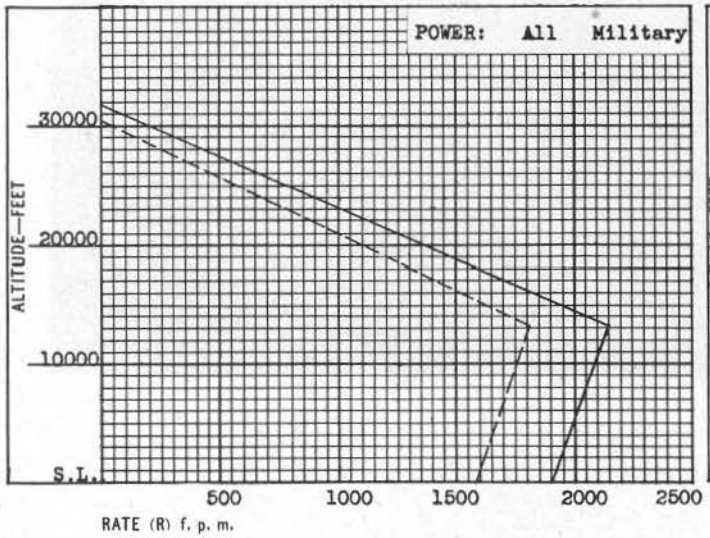
**RANGE VS. SPEED**



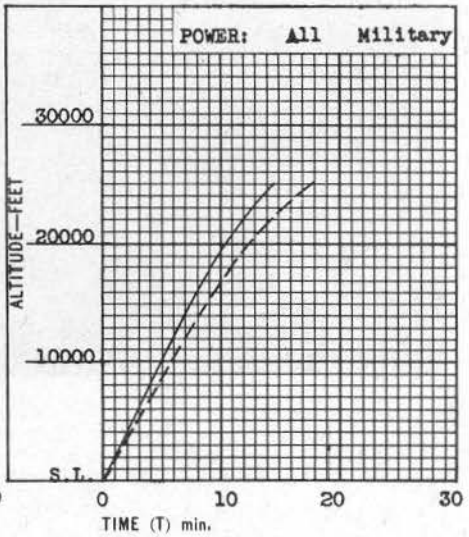

**SPEED VS. ALTITUDE**




**RATE OF CLIMB**




**TIME TO ALTITUDE**




**DATE** March 1945

**RESTRICTED**

# PERFORMANCE AND CHARACTERISTICS

# PETE 11

## TAKE-OFF

| | Load | Feet |
|---|---|---|
| **Runway Requirements** | | |
| T.O. over 50' obstacle | | |
| Landing over 50' obstacle | | |

## CLIMB—CEILING

| @ 5625 lbs. | Feet | Min. |
|---|---|---|
| Rate @ S.L. | 1900 | 1 |
| Rate @13,100 ft. | 2150 | 1 |
| Time to 10,000' | | 5.0 |
| Time to 20,000' | | 10.4 |
| Service ceiling 30,900' | | |

## AIRCRAFT

Duty Reconnaissance

Designation Type 0

Description Central float Biplane

Mfg. Sasebo Naval Arsenal Mitsubishi

Engines 1 Crew 2

Construction All Metal

## SPEED

| @ 5625 lbs. | Mph. | Knts. | Altitude |
|---|---|---|---|
| Maximum | 199 | 173 | @ S. L. |
| Maximum | 236 | 204 | @13,100' |
| 75% Vmax. Cruising | 144 | 125 | 1,500' |
| Economical | | | |

## BOMBS—CARGO

| | No. | Size | Total Lbs. |
|---|---|---|---|
| Normal | None | | |
| Maximum | 2 | 60 kg | 264 |

## ENGINES

| | H. P. | Altitude |
|---|---|---|
| Take-off | 840 | S.L. |
| Normal | 665 | 1500' |
| Military | 865 | 13,100' |
| War Emerg. | 910 | 11,400' |

Mfg. Mitsubishi

Model Zuisei Model 13

Type Radial

Cylinders 14 Cooling Air

Supercharger Single Speed

Propeller 3-Blade CSVP Diam. 9.5'

Fuel - Take-off 87 Cruising 87

## WEIGHTS

| | Lbs. |
|---|---|
| Empty | 4250 |
| Gross | 5625 |
| Overload | 6200 |

## FUEL

| | U.S. gal. | Imp. gal. |
|---|---|---|
| Built-in | 166 | 135 |
| Internal (Removable) | | |
| External (drop) | | |
| Maximum | 166 | 135 |

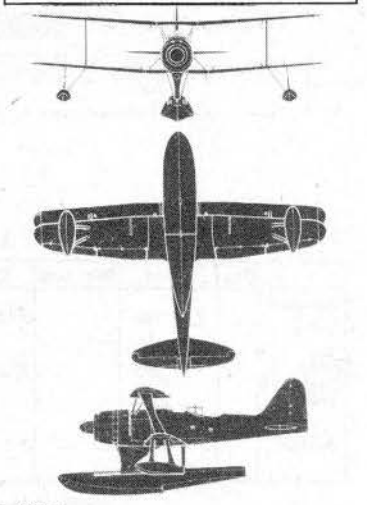
## RANGE AND RADIUS

| | Miles | | Speed | | Alt. | Fuel gal. | | Bombs | Cargo |
|---|---|---|---|---|---|---|---|---|---|
| | stat. | naut. | mph. | Knts. | feet | U. S. | Imp. | lbs. | lbs. |
| Maximum range (maximum fuel) | 1025 | 890 | 111 | 96 | 1500 | 166 | 135 | None | |
| Maximum range (normal fuel) | 800 | 695 | 109 | 95 | 1500 | 132 | 110 | 263 | |
| Radius ( ) | | | | | | | | | |
| Radius ( ) | | | | | | | | | |

## DIMENSIONS

Span 36' Length 31'

Height 15' Wing area 318.2 sq.ft.



## GENERAL DATA

Although PETE is used principally for short range observation, it can carry two bombs under the wings on racks outside the propeller arc.

**RESTRICTED**

**DATE** March 1945

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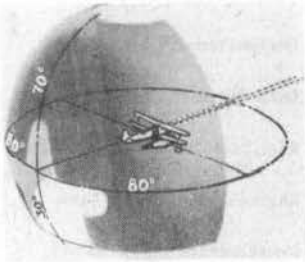
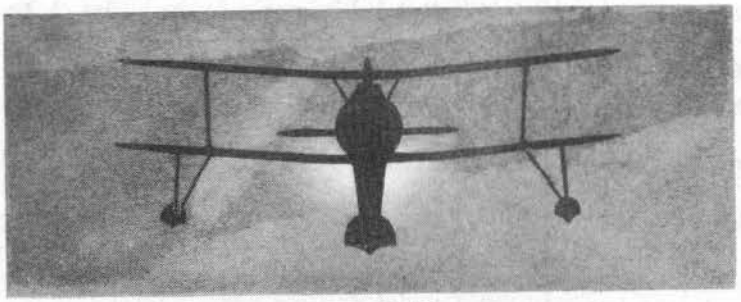
# PETE 11

## FIELDS OF FIRE




TOP GUN "B" AND FORWARD GUNS "A"
¾-rear view from above

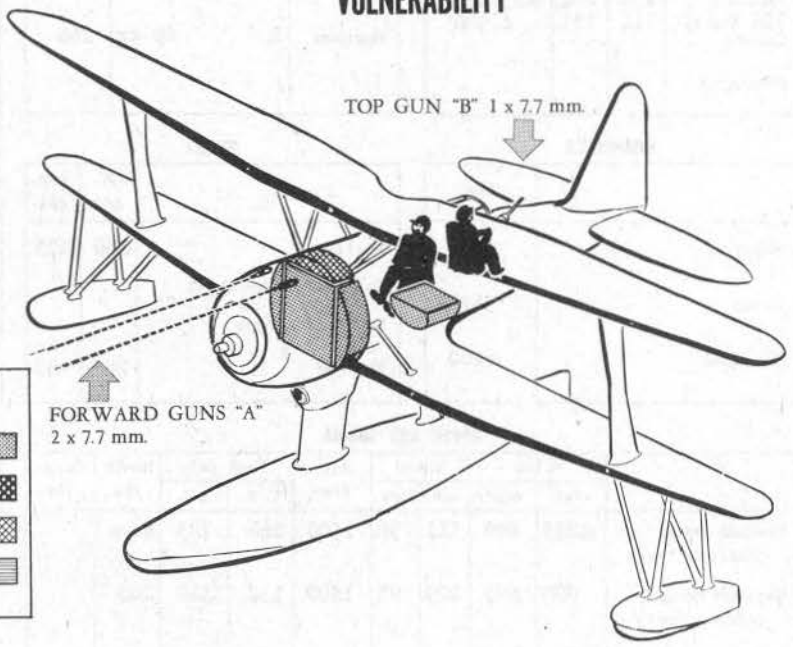
## EXHAUST FLAME PATTERNS



REAR VIEW

## VULNERABILITY

Location of oxygen cylinders unknown




LEGEND
- Fuel tanks, unprotected
- Fuel tanks, self-sealing
- Oil tanks, unprotected
- Oil tanks, self-sealing

## ARMAMENT

| | No. | Size | Rds. Gun | Type | | No. | Size | Rds. Gun | Type |
|---|---|---|---|---|---|---|---|---|---|
| Forward Cowl | 2 | 7.7 mm | | Fixed | Tail | | | | |
| Top Rear Cockpit Side | 1 | 7.7 mm | | Flex. | Wing | | | | |
| Bottom | | | | | | | | | |

## TACTICAL DATA

PETE 11 has neither armor nor fuel tank protection

DATE March 1945

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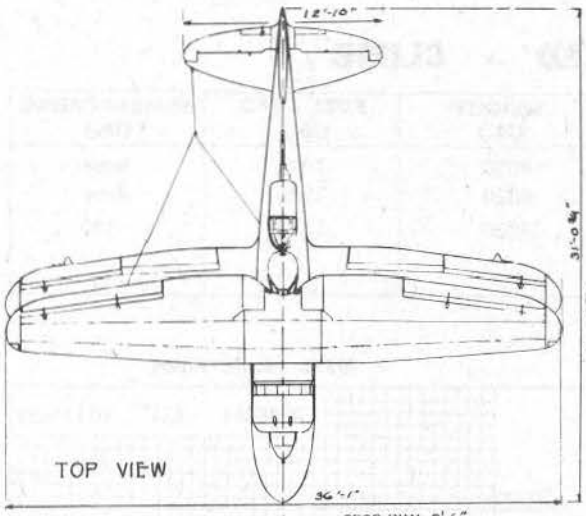
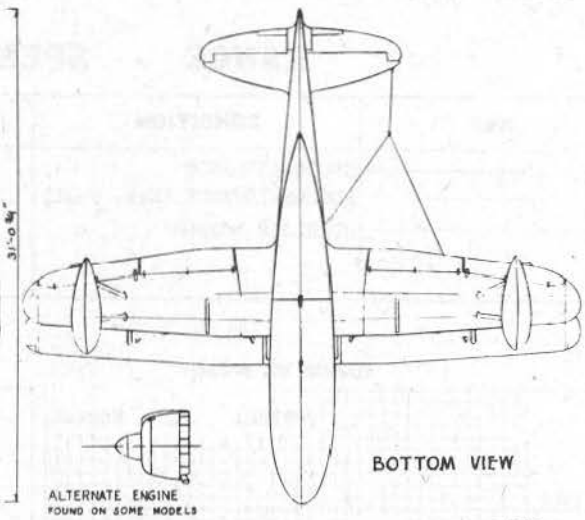
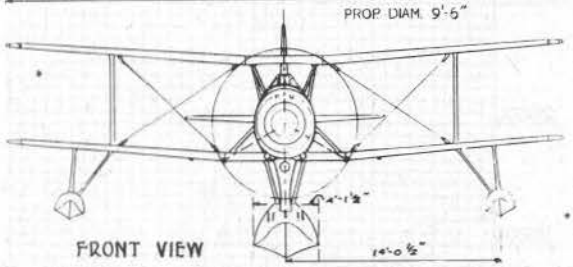
# PETE 11

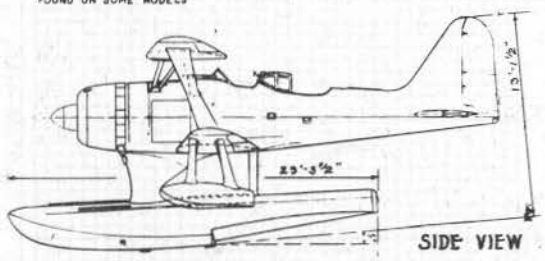


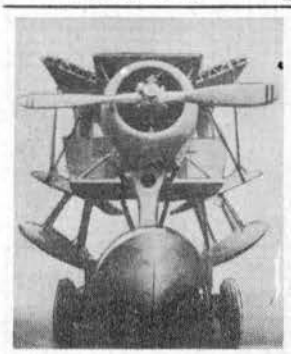



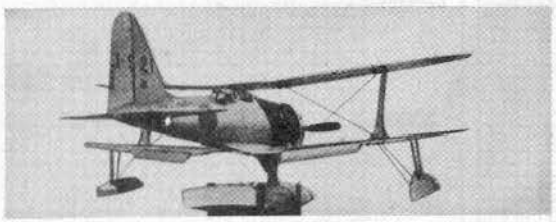


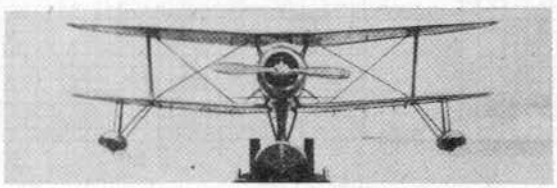


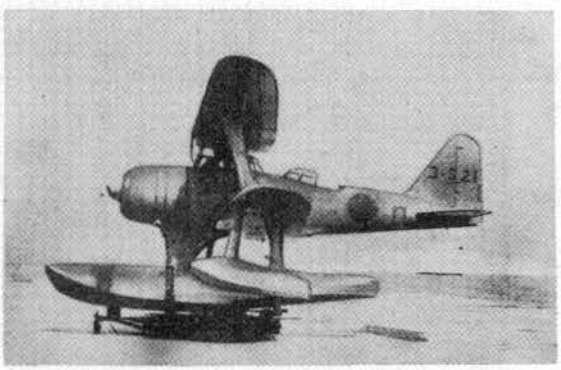








**RESTRICTED**

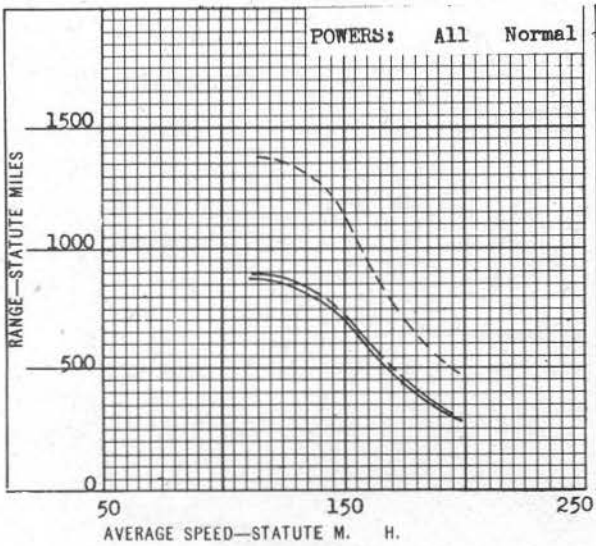
**DATE** March 1945

# JAKE 11

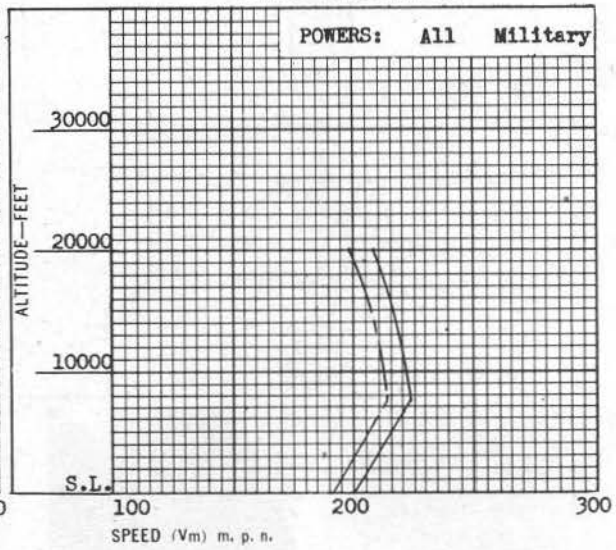
## RANGE * SPEED * CLIMB

| KEY | CONDITION | WEIGHT (lb.) | FUEL LOAD (lb.) | BOMBS—CARGO (lb.) |
|---|---|---|---|---|
| ——— | RECONNAISSANCE | 8050 | 1074 | None |
| – – – – | RECONNAISSANCE (Max. Fuel) | 8820 | 1786 | None |
| ——— – ——— | OVERLOAD BOMBER | 8820 | 1210 | 530 |

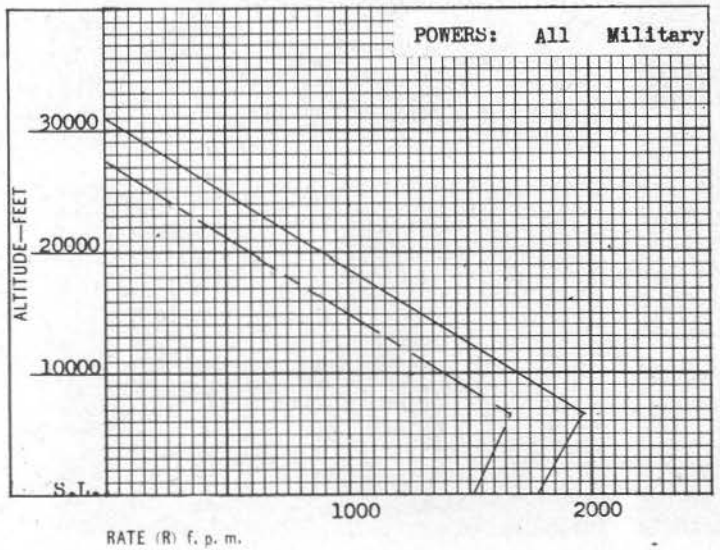
RANGE VS. SPEED



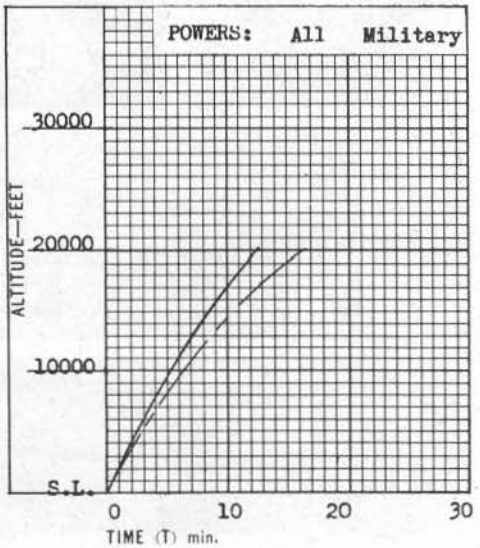

SPEED VS. ALTITUDE




RATE OF CLIMB




TIME TO ALTITUDE




**DATE** December 1944

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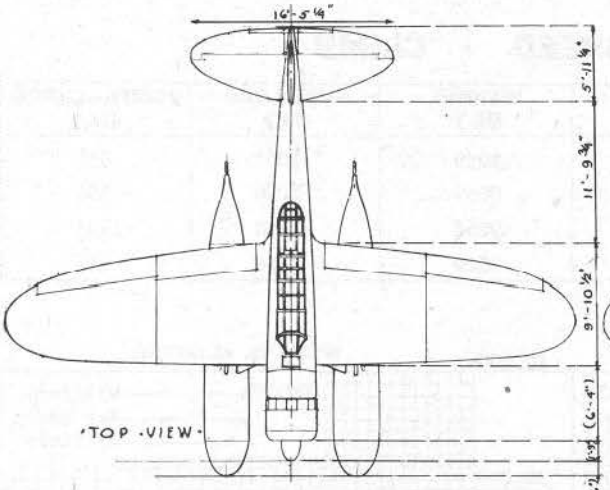
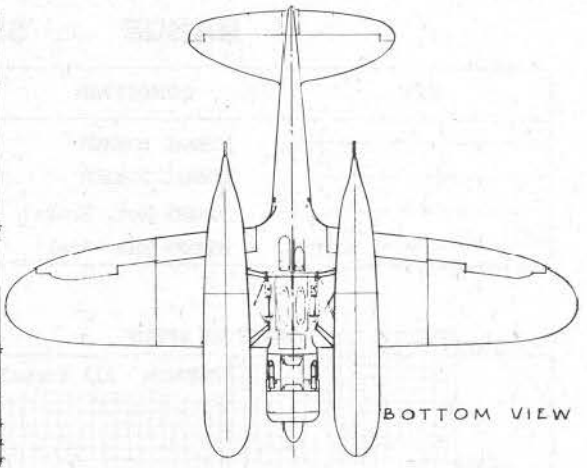
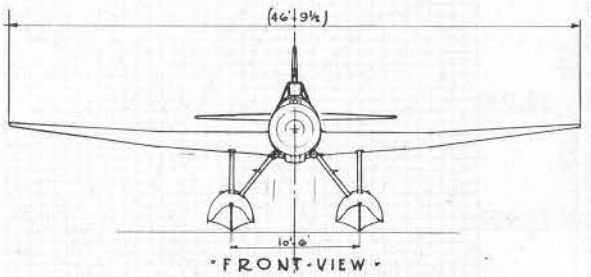
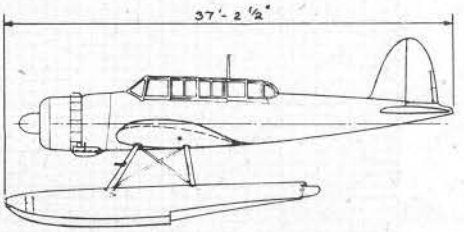
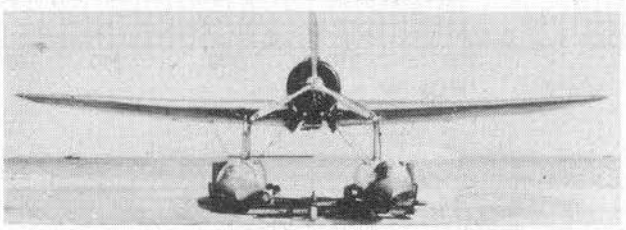
# JAKE 11

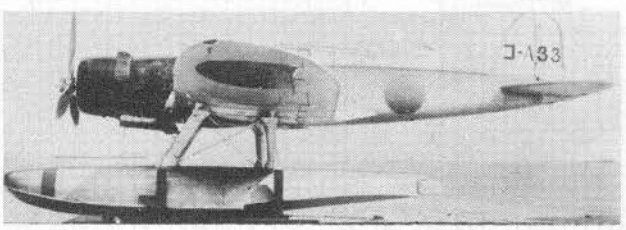


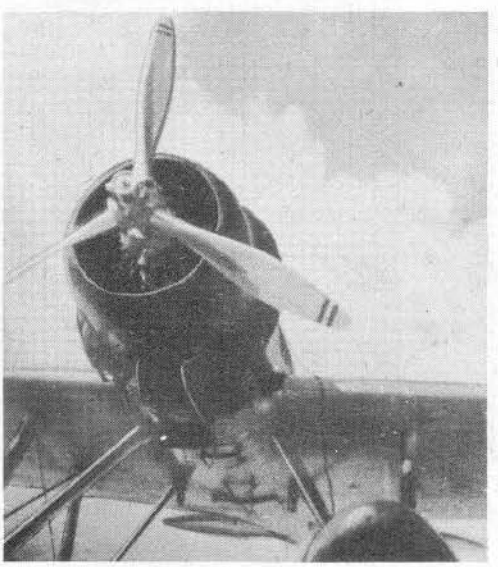



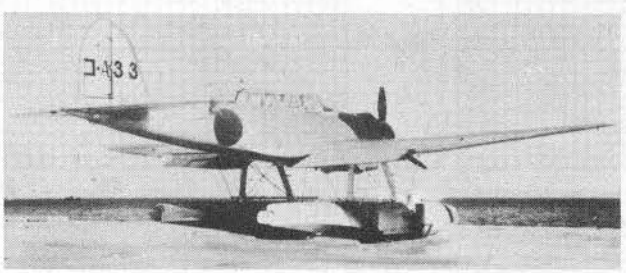





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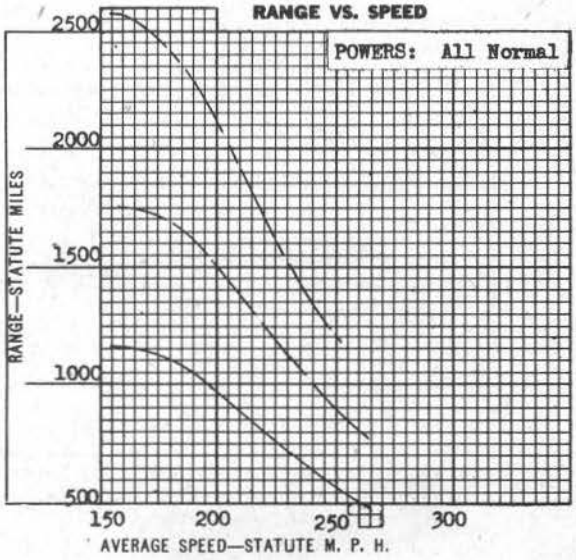
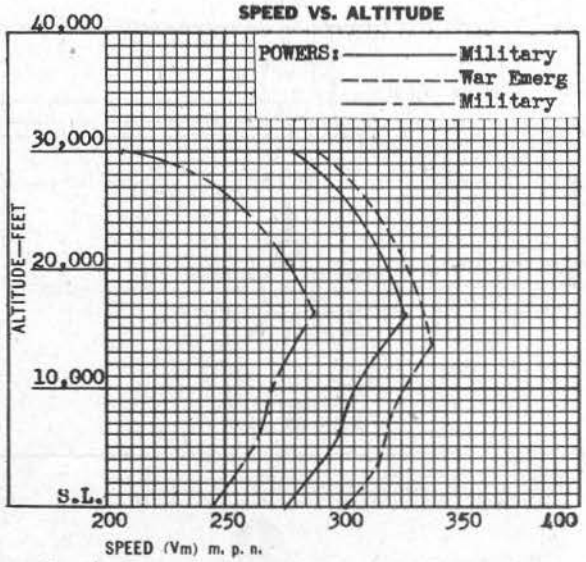
**DATE** December 1944

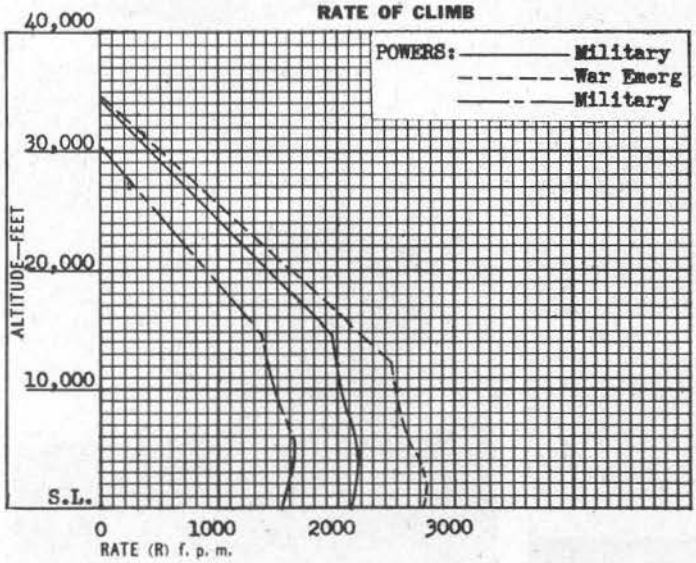
# JUDY 11

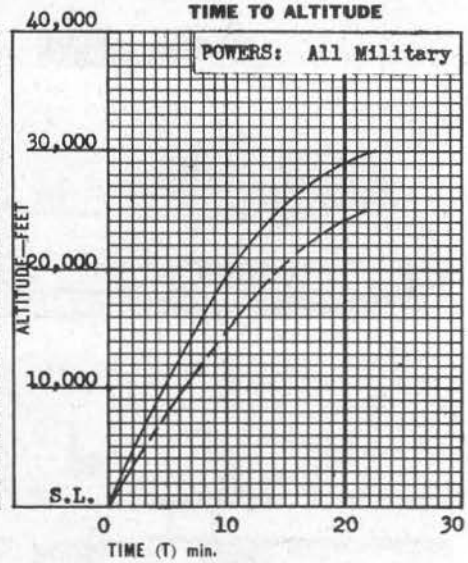
## RANGE • SPEED • CLIMB

| KEY | CONDITION | WEIGHT (lb.) | FUEL LOAD (lb.) | BOMBS—CARGO (lb.) |
|---|---|---|---|---|
| ——— | NORMAL BOMBER | 8059 | 1030 | 551 |
| - - - - - | NORMAL BOMBER | 8059 | 1030 | 551 |
| —— —— —— | BOMBER (Max. Bombs) | 9264 | 1650 | 1103 |
| —— - —— - | BOMBER (Max. Fuel) | 9829 | 2616 | 551 |




**DATE** March 1945

**RESTRICTED**

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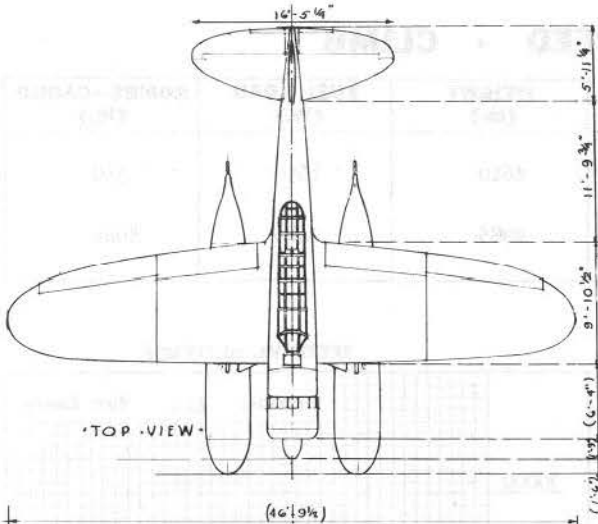
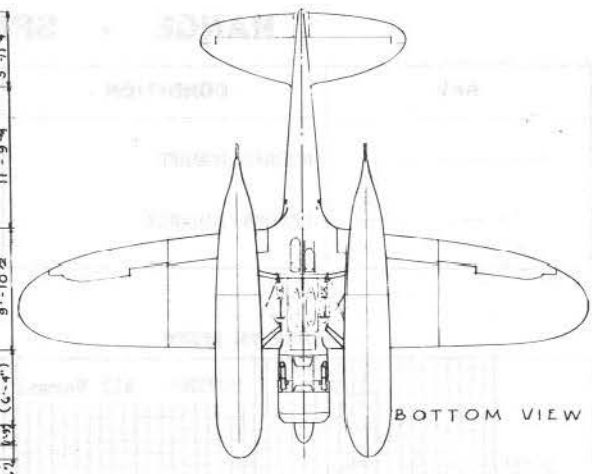
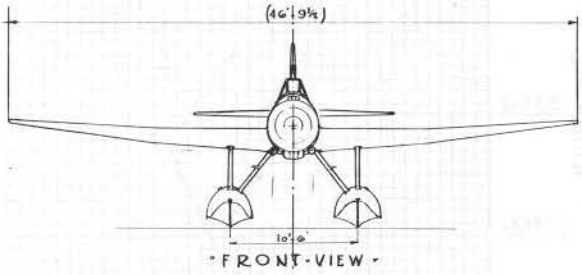
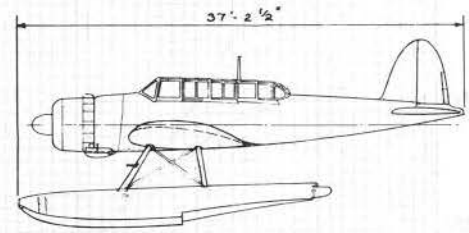
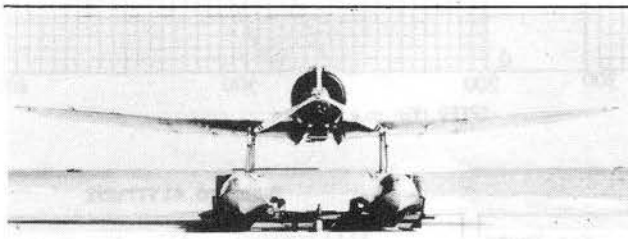
# JAKE 11

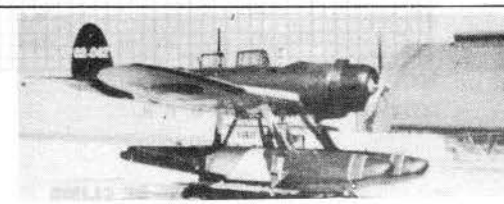


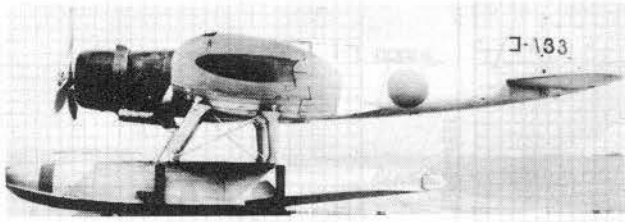



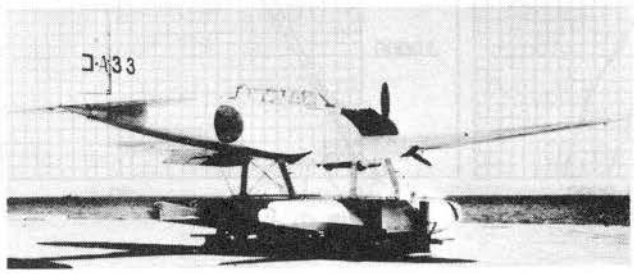







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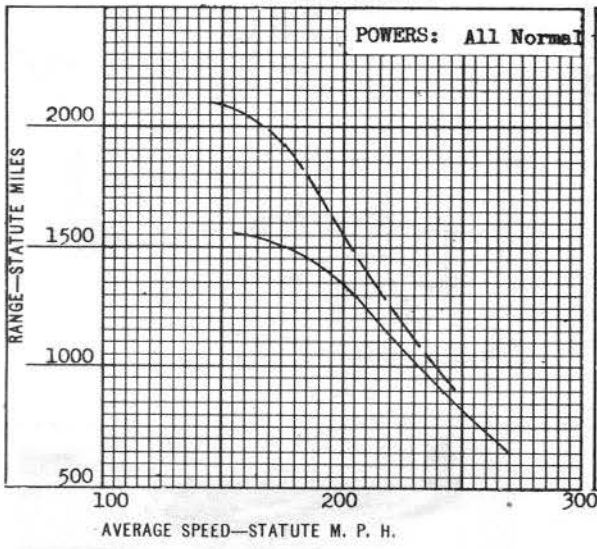
**DATE** December 1944

# JUDY 11

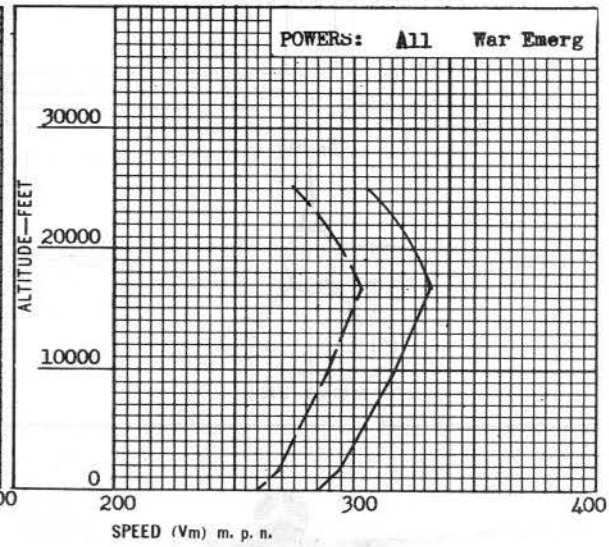
## RANGE * SPEED * CLIMB

| KEY | CONDITION | WEIGHT (lb.) | FUEL LOAD (lb.) | BOMBS—CARGO (lb.) |
|---|---|---|---|---|
| ——— | NORMAL BOMBER | 8610 | 1650 | 550 |
| — — — | RECONNAISSANCE | 8985 | 2466 | None |

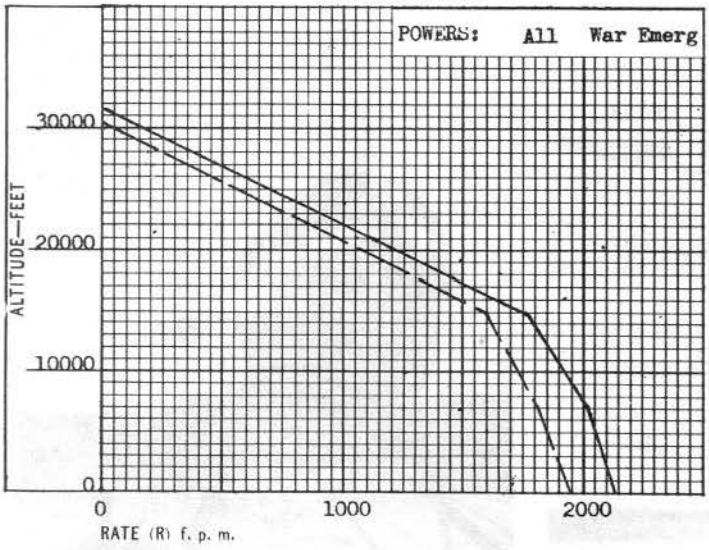
**RANGE VS. SPEED**



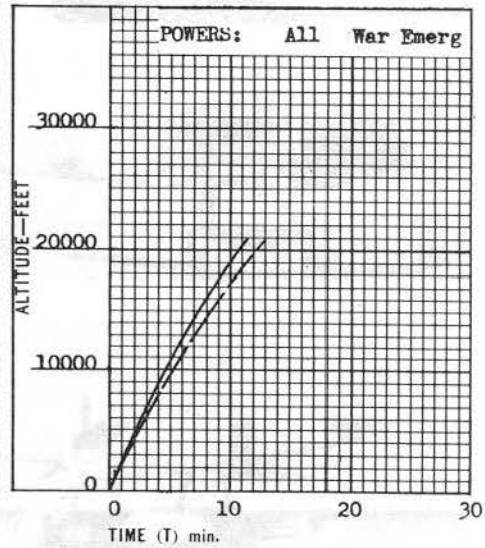

**SPEED VS. ALTITUDE**




**RATE OF CLIMB**




**TIME TO ALTITUDE**




**DATE** December 1944

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# PERFORMANCE AND CHARACTERISTICS

# JUDY 11

## TAKE-OFF

| | Load | Feet |
|---|---|---|
| **Runway Requirements** | 8059 | 1100 |
| T.O. over 50' obstacle | | |
| Landing over 50' obstacle | | |
| * T.O. + 100% | | |

## CLIMB—CEILING

| @ 8059 lbs. | Feet | Min. |
|---|---|---|
| Rate @ S.L. | 2110 | 1 |
| Rate @ 4900 ft. | 2180 | 1 |
| Time to 10,000' | | 4.7 |
| Time to 20,000' | | 10.2 |
| Service ceiling 33,100' | | |

## AIRCRAFT

Duty Dive Bombing; Reconnaissance

Designation (Suisei) Model 11 (Recce version is Type 2)

Description Low mid-wing Monoplane

Mfg. Aichi

Engines 1 Crew 2

Construction All Metal

## SPEED

| @ 8059 lbs. | Mph. | Knts. | Altitude |
|---|---|---|---|
| Maximum WE | 302 | 261 | @ S. L. |
| Maximum WE | 339 | 295 | @ 13,800' |
| Cruising 75% | 198 | 172 | 1,500' |
| Economical | | | |

## BOMBS—CARGO

| | No. | Size | Total Lbs. |
|---|---|---|---|
| Normal | 1 | 250 kg | 550 |
| Maximum | 1 | 500 kg | 1100 |

## ENGINES

| | H. P. | Altitude |
|---|---|---|
| Take-off | 1185 | S.L. |
| Normal | 815 | 1500' |
| Military | 995<br>955 | 4900'<br>14800' |
| War Emerg. | 1205 | 1400' |

Mfg. Aichi

Model Atsuta 21

Type Inverted 60° Vee

Cylinders 12 Cooling Liquid

Supercharger Single Speed Hydraulic

Propeller 3 Blade Diam. 10.5' C.S.

Fuel - Take-off 92 Cruising 92

## WEIGHTS

| | Lbs. |
|---|---|
| Empty | 5620 |
| Gross | 8059 |
| Overload | 9264 |

## FUEL

| | U.S. gal. | Imp. gal. |
|---|---|---|
| Built-in | 275 | 230 |
| Internal (Removable) | | |
| External (drop) | 160 | 133 |
| Maximum | 435 | 363 |

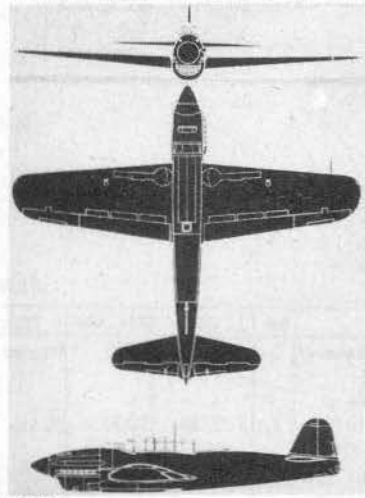
## RANGE AND RADIUS

| | Miles | | Speed | | Alt. feet | Fuel gal. | | Bombs lbs. | Cargo lbs. |
|---|---|---|---|---|---|---|---|---|---|
| | stat. | naut. | mph. | Knts. | | U. S. | Imp. | | |
| Maximum range (maximum fuel) | 2580 | 2238 | 155 | 135 | 1500 | 435 | 363 | 550 | |
| At 75% Vmax. | 2280 | 1978 | 191 | 165 | 1500 | 435 | 363 | 550 | |
| Maximum range (normal fuel) | 1155 | 1000 | 155 | 135 | 1500 | 172 | 143 | 550 | |
| At 75% Vmax. Radius ( ) | 985 | 850 | 198 | 172 | 1500 | 172 | 143 | 550 | |
| Radius ( ) | | | | | | | | | |

## DIMENSIONS

Span 37.8' Length 33.6'

Height 10.4' Wing area 254 sq.ft.

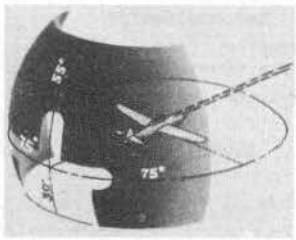


## GENERAL DATA

JUDY was first reported operational in September 1943. It is a high performance, two-place, carrier borne aircraft which is used for both dive bombing and reconnaissance. When on reconnaissance duties it is equipped with a "K-8" aerial camera with 25 or 50 cm lens.

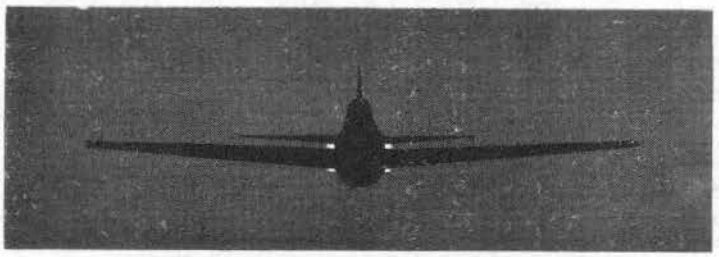
# JUDY 11

## FIELDS OF FIRE



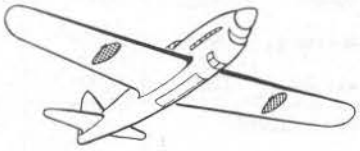

FORWARD GUNS "A" AND TOP GUN "B"
Bi-rear view from above
TOP GUN "B" field of fire is provisional

## EXHAUST FLAME PATTERNS

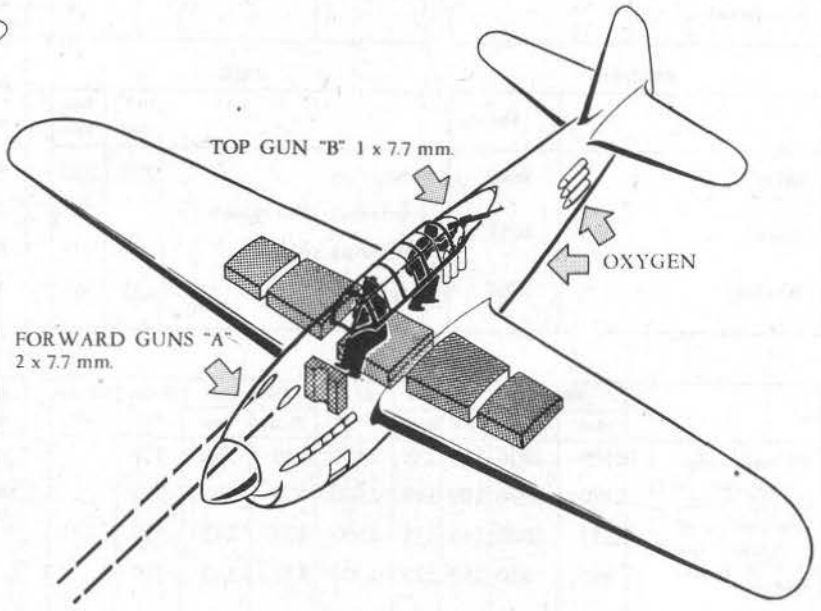


REAR VIEW

## VULNERABILITY



Auxiliary gas tanks
Jettisonable




LEGEND
- Fuel tanks, unprotected
- Fuel tanks, self-sealing
- Oil tanks, unprotected
- Oil tanks, self-sealing

### ARMAMENT

| | No. | Size | Rds. Gun | Type | | No. | Size | Rds. Gun | Type |
|---|---|---|---|---|---|---|---|---|---|
| Forward | 2 | 7.7 mm | 791 | Fixed | Tail | | | | |
| Top Rear Cockpit | 1 | 7.7 mm | 1000 | Flex. | Wing | | | | |
| Bottom | | | | | | | | | |

### TACTICAL DATA

JUDY has neither pilot nor fuel tank protection. Clean and fast, JUDY will probably depend on speed for protection.

**DATE** December 1944

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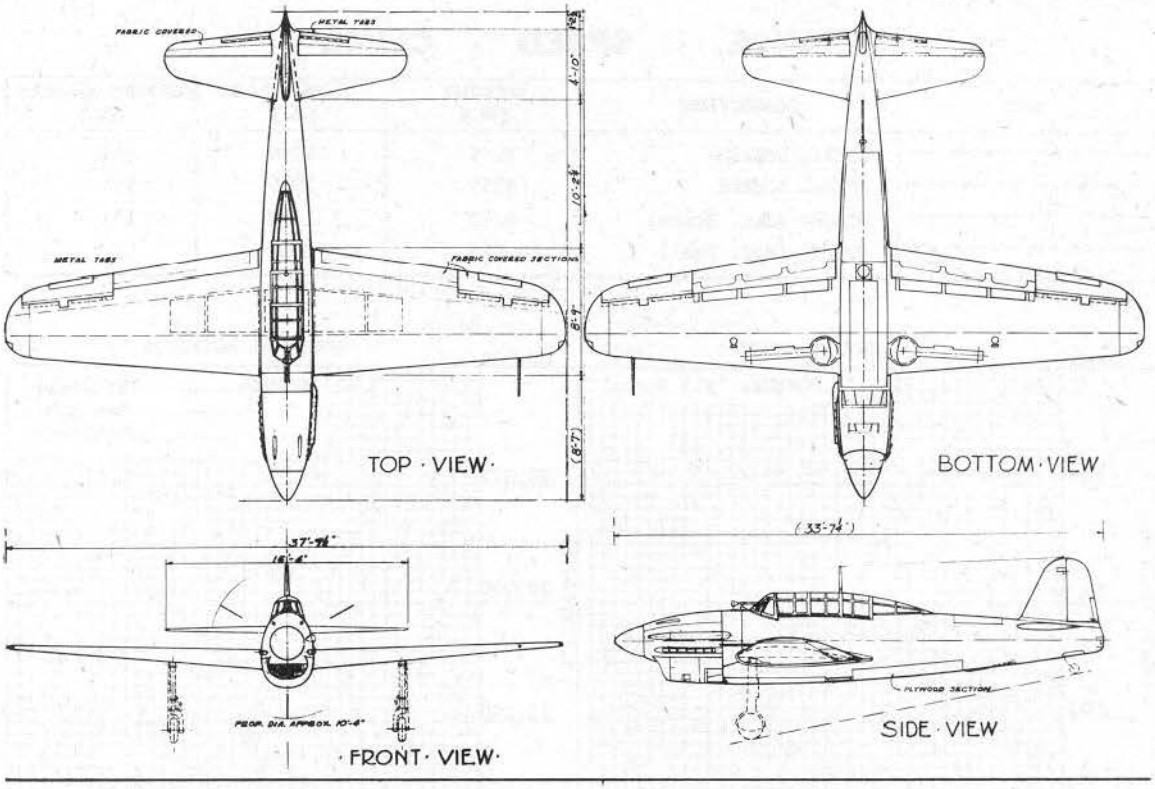
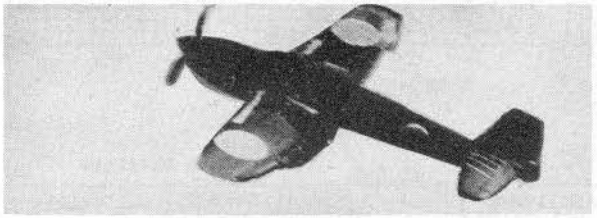
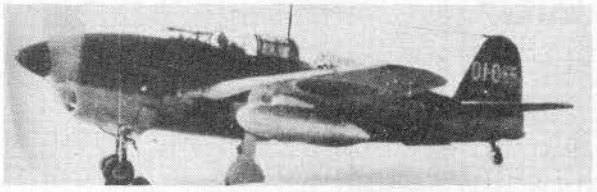
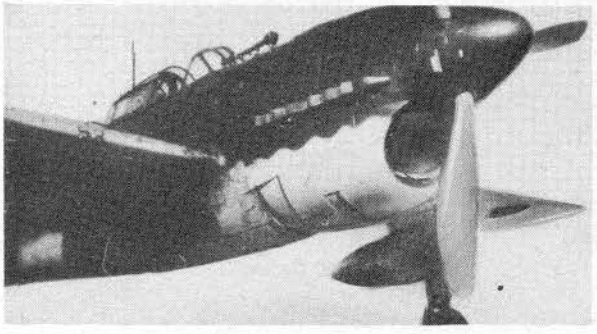
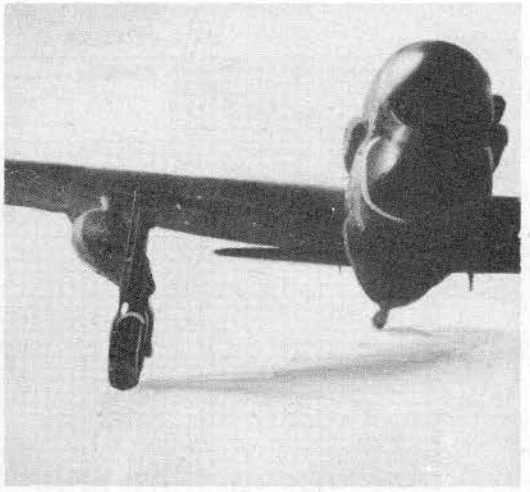
# JUDY 11









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**DATE** March 1945

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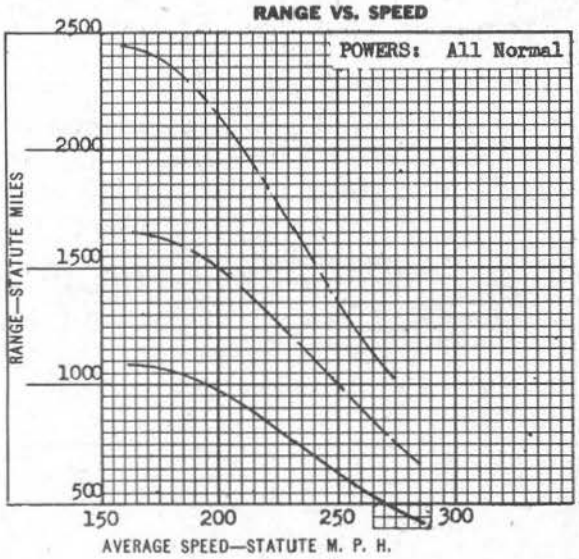
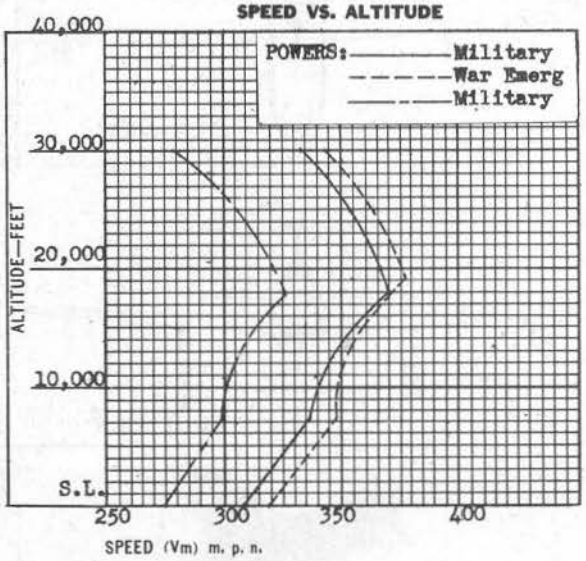
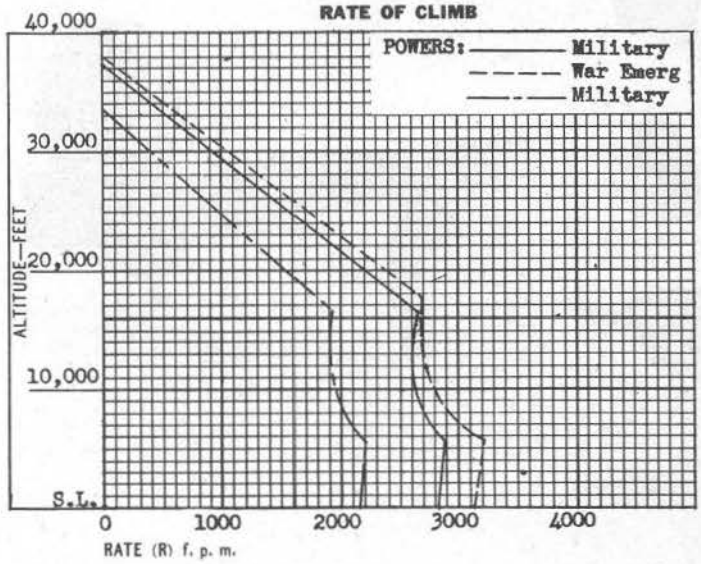
# JUDY 12

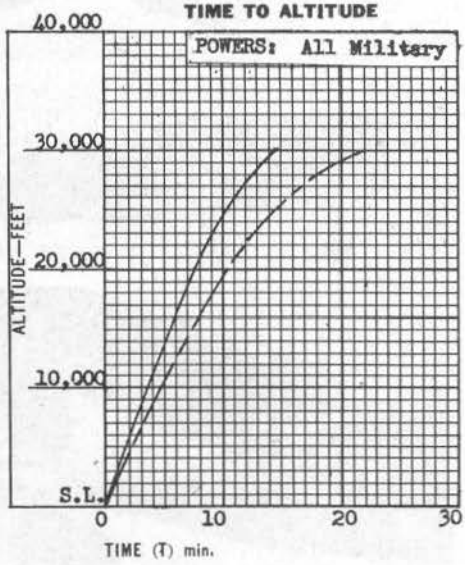
## RANGE * SPEED * CLIMB

| KEY | CONDITION | WEIGHT (lb.) | FUEL LOAD (lb.) | BOMBS—CARGO (lb.) |
|---|---|---|---|---|
| ——— | NORMAL BOMBER | 8255 | 1030 | 551 |
| – – – – | NORMAL BOMBER | 8255 | 1030 | 551 |
| ——— ——— | BOMBER (Max. Bombs) | 9460 | 1650 | 1103 |
| ——— – ——— | BOMBER (Max. Fuel) | 10,025 | 2616 | 551 |




**DATE** March 1945

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# PERFORMANCE AND CHARACTERISTICS

# JUDY 12

## TAKE-OFF

| | Load | Feet |
|---|---|---|
| **Runway Requirements** | 8255 | 1200 |
| T.O. over 50' obstacle | | |
| Landing over 50' obstacle | | |

## CLIMB—CEILING

| @ 8255 lbs. | Feet | Min. |
|---|---|---|
| Rate @ S.L. | 2820 | 1 |
| Rate @ 5500 ft. | 2895 | 1 |
| Time to 10,000' | | 3.6 |
| Time to 20,000' | | 7.5 |
| Service ceiling 36,400' | | |

## AIRCRAFT

Duty Dive Bombing
Reconnaissance
Designation (Suisei) Model 12
(Recce Version is Type 2)
Description Low mid-wing
Monoplane
Mfg. Aichi
Engines 1 Crew 2
Construction All Metal

## SPEED

| @ 8255 lbs. | Mph. | Knts. | Altitude |
|---|---|---|---|
| Maximum WE | 319 | 277 | @ S.L. |
| Maximum WE | 377 | 326 | @ 19,300' |
| Cruising 75% | 215 | 187 | 1,500' |
| Economical | | | |

## BOMBS—CARGO

| | No. | Size | Total Lbs. |
|---|---|---|---|
| Normal | 1 | 250 kg | 550 |
| or | 2 | 100 kg | 440 |
| Maximum | 1 | 500 kg | 1100 |

## ENGINES

| | H. P. | Altitude |
|---|---|---|
| W.E. Take-off | 1380 | S.L. |
| Normal | | |
| Military | (1265 | (S.L. |
| | (1265 | (16,400' |
| War Emerg. | (1320 | (5,550 |
| | (1440 | 5,700' |

Mfg. Aichi
Model Atsuta 31
Type Inverted 60° Vee
Cylinders 12 Cooling Liquid
Supercharger 2 Speed
Propeller 3-Blade C.S. Diam. 10.5'
Fuel - Take-off 92 Cruising 92

## WEIGHTS

| | Lbs. |
|---|---|
| Empty | 5620 |
| Gross | 8255 |
| Overload | 10025 |

## FUEL

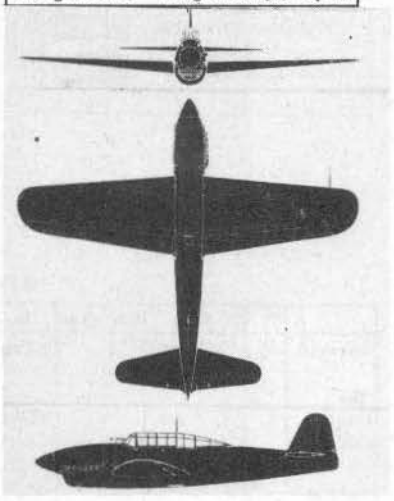
| | U.S. gal. | Imp. gal. |
|---|---|---|
| Built-in | 275 | 230 |
| Internal (Removable) | | |
| External (drop) | 160 | 133 |
| Maximum | 435 | 363 |

## RANGE AND RADIUS

| | Miles | | Speed | | Alt. feet | Fuel gal. | | Bombs lbs. | Cargo lbs. |
|---|---|---|---|---|---|---|---|---|---|
| | stat. | naut. | mph. | Knts. | | U. S. | Imp. | | |
| Maximum range (maximum fuel) | 2445 | 2122 | 160 | 139 | 1500 | 435 | 363 | 550 | |
| At 75% Vmax. | 2070 | 1800 | 206 | 178 | 1500 | 435 | 363 | 550 | |
| Maximum range (normal fuel) | 1080 | 935 | 162 | 140 | 1500 | 172 | 143 | 550 | |
| At 75% Vmax. | 890 | 780 | 215 | 187 | 1500 | 172 | 143 | 550 | |
| Radius ( ) | | | | | | | | | |
| Radius ( ) | | | | | | | | | |

## DIMENSIONS

Span 37.8' Length 33.6'
Height 10.4' Wing area 254 sq.ft.



## GENERAL DATA

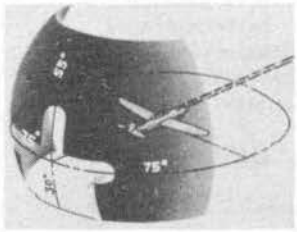
In the "Type 2 Land Reconnaissance version (D4Y2-R), a 'K-8' camera with either 25 or 50 cm lens is installed in the after end of the rear cockpit.

Further information on JUDY 12 is contained in TAIC Summary No. 18 of December 1944.

206B-3

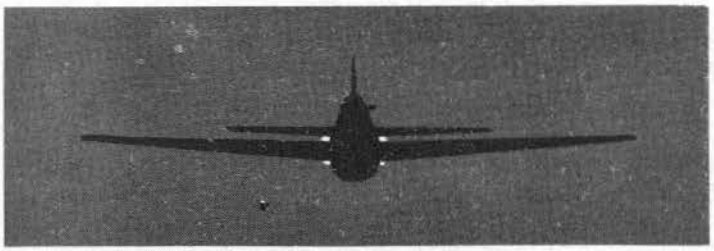
# JUDY 12

## FIELDS OF FIRE



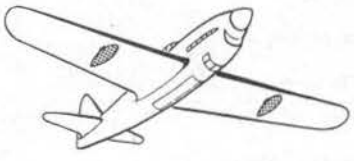
FORWARD GUNS "A"
AND TOP GUN "B"
¾-rear view from above
TOP GUN "B" field
of fire is provisional

## EXHAUST FLAME PATTERNS

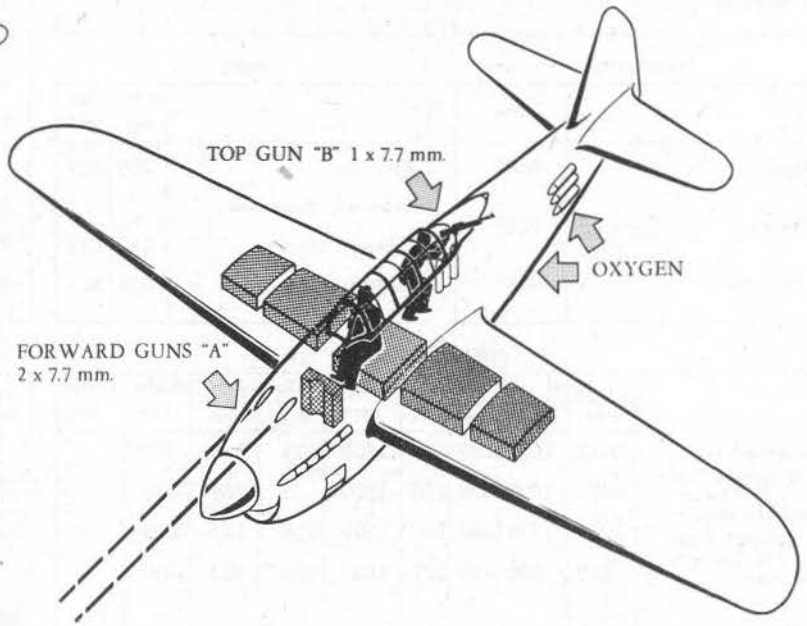


REAR VIEW

## VULNERABILITY



Auxiliary gas tanks
Jettisonable




LEGEND
- Fuel tanks, unprotected
- Fuel tanks, self-sealing
- Oil tanks, unprotected
- Oil tanks, self-sealing

### ARMAMENT

| | No. | Size | Rds. Gun | Type | | No. | Size | Rds. Gun | Type |
|---|---|---|---|---|---|---|---|---|---|
| Forward | 2 | 7.7 mm | | fixed | Tail | | | | |
| Top rear Cockpit | 1 | 7.7 mm | | Flex. | Wing | | | | |
| Bottom | | | | | | | | | |

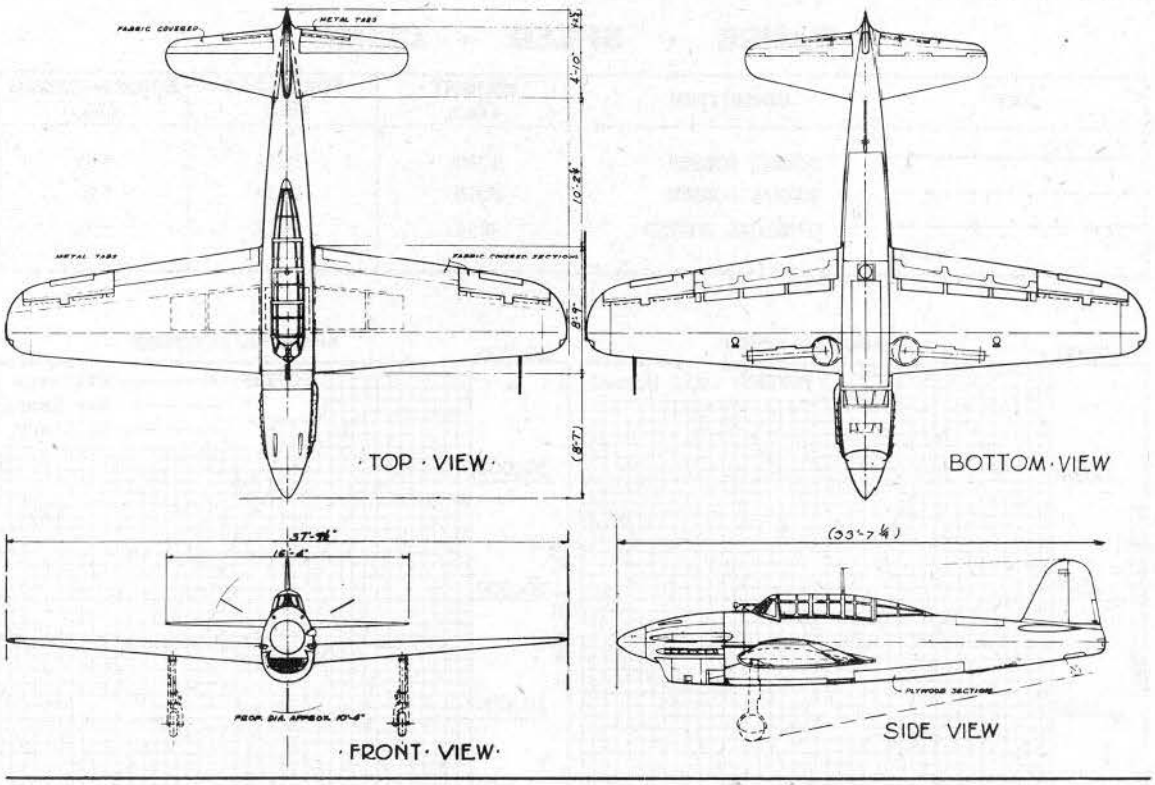
### TACTICAL DATA

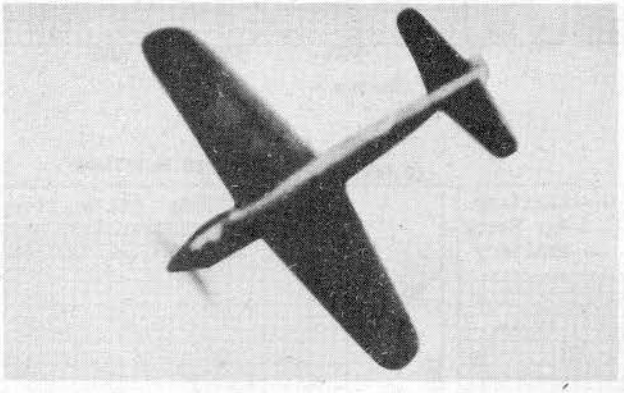
Same as for JUDY 11 except for increased speed and climb.

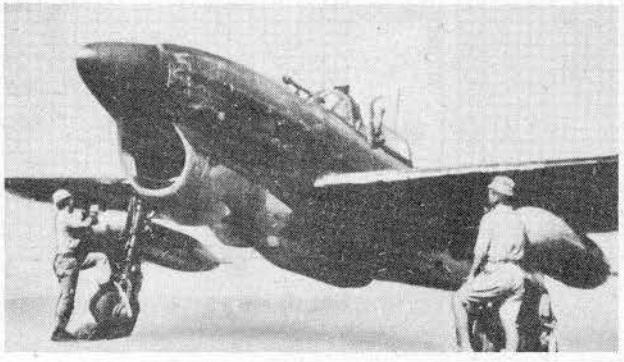
**DATE** December 1944

**RESTRICTED**

# JUDY 12





**RESTRICTED**

**DATE** March 1945

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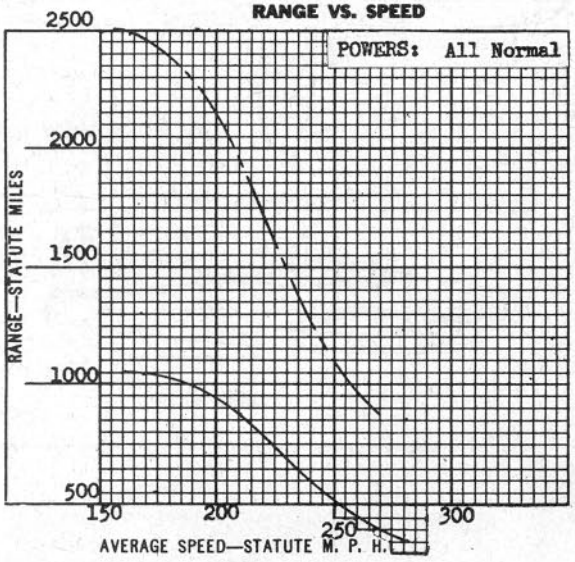
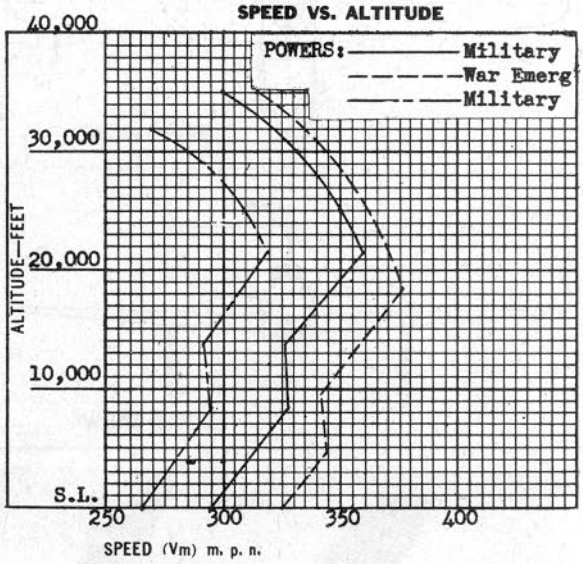
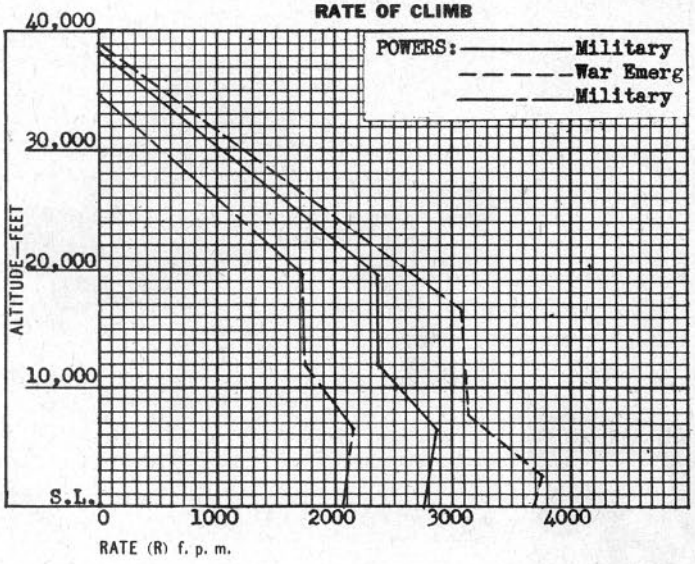
# JUDY 33

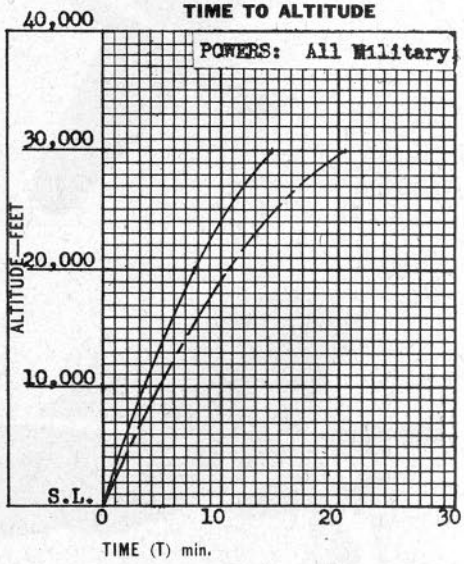
## RANGE * SPEED * CLIMB

| KEY | CONDITION | WEIGHT (lb.) | FUEL LOAD (lb.) | BOMBS—CARGO (lb.) |
|---|---|---|---|---|
| ——— | NORMAL BOMBER | 8080 | 1032 | 550 |
| – – – – | NORMAL BOMBER | 8080 | 1032 | 550 |
| ——— – ——— | OVERLOAD BOMBER | 9855 | 2615 | 550 |




DATE March 1945

RESTRICTED

# PERFORMANCE AND CHARACTERISTICS

# JUDY 33

## TAKE-OFF

| | Load | Feet |
|---|---|---|
| **Runway Requirements** | 8080 | 1100 |
| T.O. over 50' obstacle | | |
| Landing over 50' obstacle | | |
| * T.O. + 100% | | |

## CLIMB—CEILING

| @ 8080 lbs. | Feet | Min. |
|---|---|---|
| Rate @ S.L. | 2750 | 1 |
| Rate @ 6500 ft. | 2880 | 1 |
| Time to 10,000' | | 3.6 |
| Time to 20,000' | | 7.8 |
| Service ceiling 38,300' | | |

## AIRCRAFT

Duty Dive Bombing; Reconnaissance

Designation Suisei Model 33 D4Y1-A

Description Low mid-wing monoplane

Mfg. Technical Air Arsenal

Engines 1 Crew 2

Construction All Metal

## SPEED

| @ 8080 lbs. | Mph. | Knts. | Altitude |
|---|---|---|---|
| Maximum | 325 | 282 | @ S. L |
| Maximum @ 75% Vmax. Cruising | 376<br>211 | 326<br>183 | @18,500'<br>1,500' |
| Economical | | | |

## BOMBS—CARGO

| | No. | Size | Total Lbs. |
|---|---|---|---|
| Normal | 1 | 250 kg | 550 |
| Maximum | 1 | 500 kg | 1000 |

## ENGINES

| WE | H. P. | Altitude |
|---|---|---|
| Take-off | 1580 | S.L. |
| Normal | 1005 | 1,500' |
| Military | 1280<br>1180 | 6,500'<br>19,700' |
| War Emerg. | 1620 | 2,800' |

Mfg. Mitsubishi

Model Kinsei 62 (Ha 33, Mod. 62)

Type Radial

Cylinders 14 Cooling Air

Supercharger 2 Speed

Propeller 3 Blade Diam. 10.5' C.S.

Fuel - Take-off 92 Cruising 92 (Methanol used)

## WEIGHTS

| | Lbs. |
|---|---|
| Empty | 5450 |
| Gross | 8080 |
| Overload | 9855 |

## FUEL

| | U.S. gal. | Imp. gal. |
|---|---|---|
| Built-in | 275 | 230 |
| Internal (Removable) | | |
| External (drop) | 160 | 133 |
| Maximum | 435 | 363 |

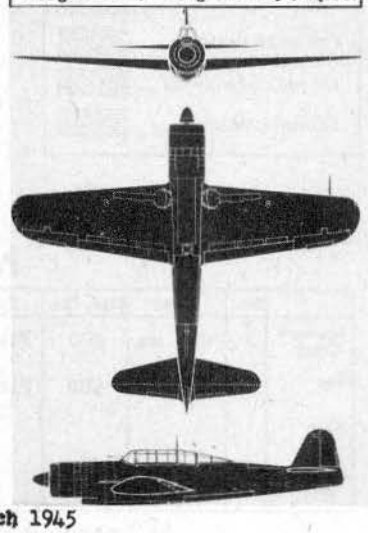
## RANGE AND RADIUS

| | Miles | | Speed | | Alt. feet | Fuel gal. | | Bombs lbs. | Cargo lbs. |
|---|---|---|---|---|---|---|---|---|---|
| | stat. | naut. | mph. | Knts. | | U. S. | Imp. | | |
| Maximum range (maximum fuel) | 2505 | 2173 | 157 | 136 | 1500 | 435 | 363 | 550 | |
| At 75% Vmax. | 2095 | 1820 | 203 | 176 | 1500 | 435 | 363 | 550 | |
| Maximum range (normal fuel) | 1055 | 914 | 161 | 139 | 1500 | 172 | 143 | 550 | |
| At 75% Vmax. | 870 | 758 | 211 | 183 | 1500 | 172 | 143 | 550 | |
| Radius ( ) | | | | | | | | | |
| Radius ( ) | | | | | | | | | |

## DIMENSIONS

Span 37.8' Length 33.6'

Height 10.4' Wing area 254 sq.ft.



## GENERAL DATA

JUDY 33 has a comparable performance to JUDY 12. It was probably developed because of maintenance difficulties encountered with the Atsuta in-line engine.

**RESTRICTED** **DATE** March 1945

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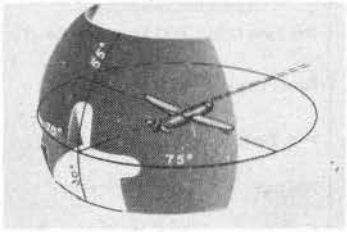
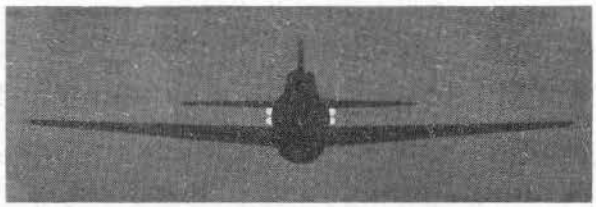
# JUDY 33

## FIELDS OF FIRE



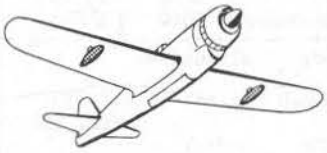
FORWARD GUNS "A"
TOP GUN "B"
¾-rear view from above
TOP GUN "B" field
of fire is provisional.

## EXHAUST FLAME PATTERNS

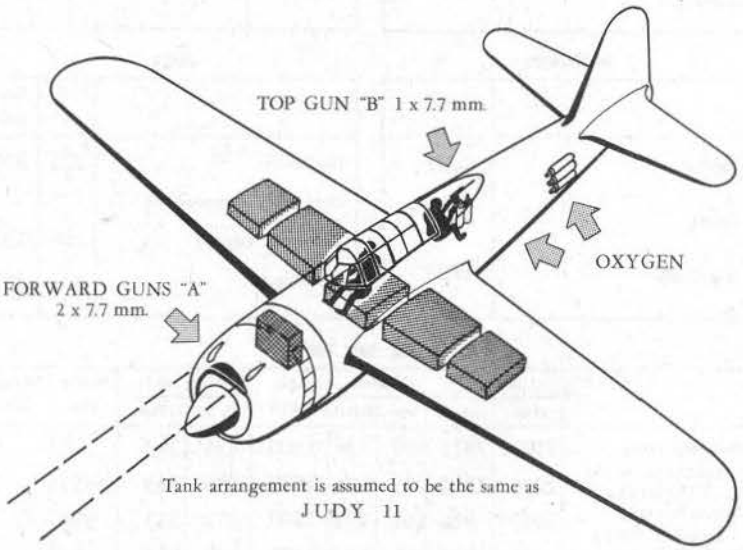


REAR VIEW

## VULNERABILITY



Auxiliary gas tanks
Jettisonable




Tank arrangement is assumed to be the same as
JUDY 11

LEGEND

- Fuel tanks, unprotected
- Fuel tanks, protected
- Oil tanks, unprotected
- Oil tanks, protected

## ARMAMENT

| | No. | Size | Rds. Gun | Type | | No. | Size | Rds. Gun | Type |
|---|---|---|---|---|---|---|---|---|---|
| Forward Cowl | 2 | 7.7 mm | 400 | Fixed | Tail | | | | |
| Top | 1 | 7.7 mm | 582 | Flex. | Wing | | | | |
| Side | | | | | | | | | |
| Bottom | | | | | | | | | |

## TACTICAL DATA

JUDY 33 has neither pilot nor fuel tank protection.

DATE March 1945

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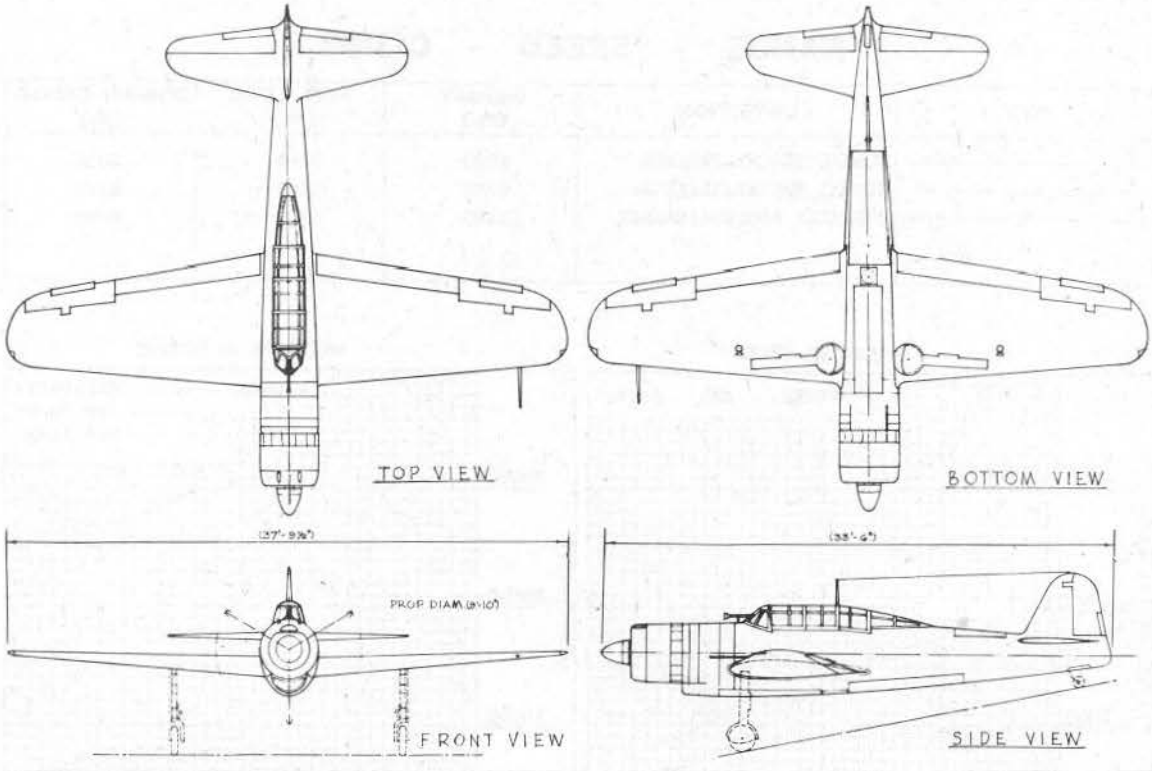
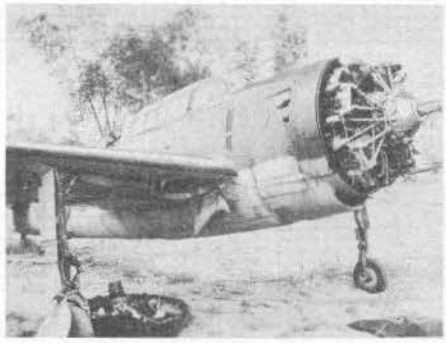
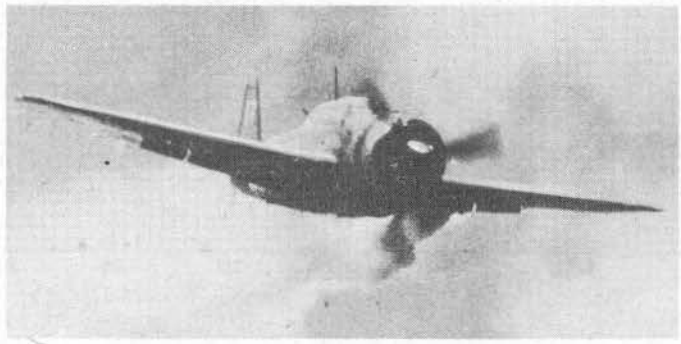
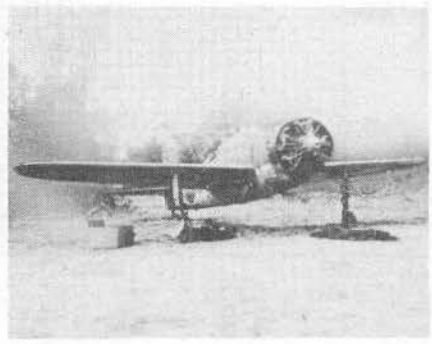
# JUDY 33







**RESTRICTED**

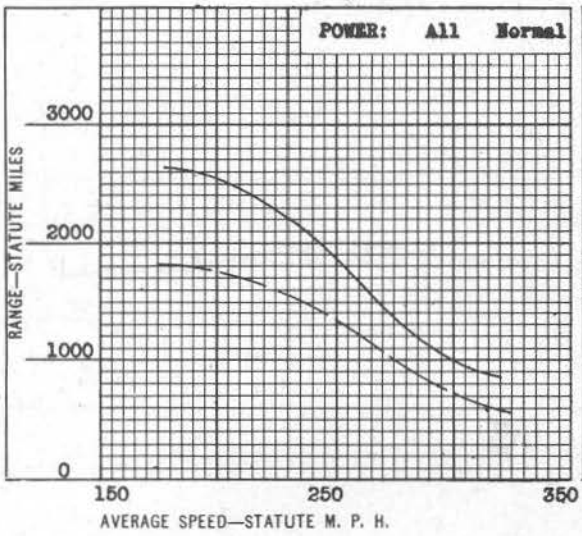
**DATE** March 1945

# MYRT 11

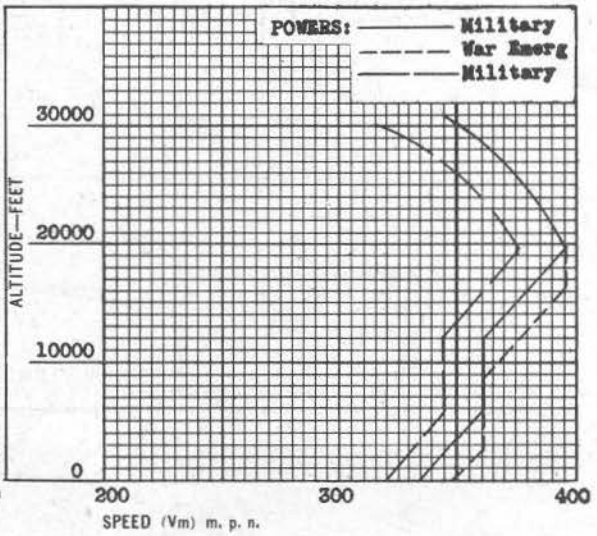
## RANGE * SPEED * CLIMB

| KEY | CONDITION | WEIGHT (lb.) | FUEL LOAD (lb.) | BOMBS—CARGO (lb.) |
|---|---|---|---|---|
| ——— | NORMAL RECONNAISSANCE | 9920 | 2148 | None |
| - - - - - - - - | NORMAL RECONNAISSANCE | 9920 | 2148 | None |
| ——— ——— ——— | OVERLOAD RECONNAISSANCE | 11580 | 3300 | None |

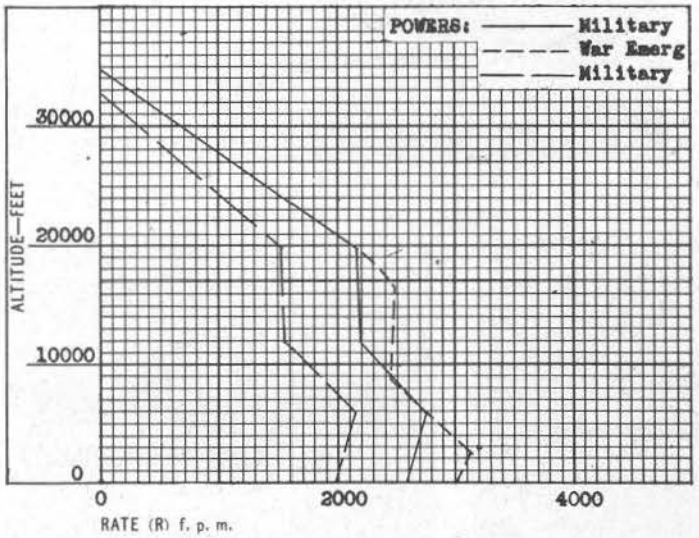
RANGE VS. SPEED



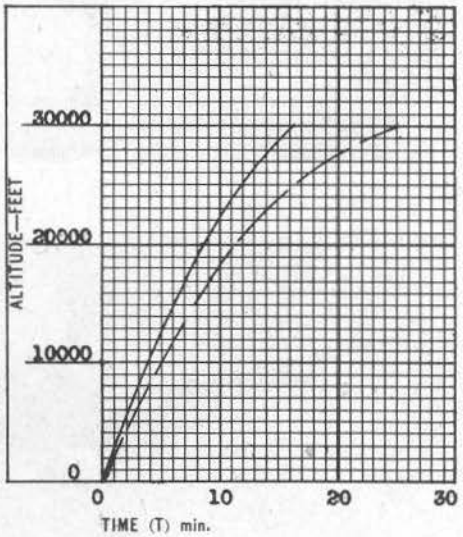

SPEED VS. ALTITUDE




RATE OF CLIMB




TIME TO ALTITUDE



# PERFORMANCE AND CHARACTERISTICS

# MYRT 11

## TAKE-OFF

| | Load | Feet |
|---|---|---|
| **Runway Requirements** | 9920 | 2050 |
| T.O. over 50' obstacle | | |
| Landing over 50' obstacle | | |
| * T.O. + 100% | | |

## CLIMB—CEILING

| @ 9920 lbs. | Feet | Min. |
|---|---|---|
| Rate @ S.L. | 2600 | 1 |
| Rate @ 5900 ft. | 2740 | 1 |
| Time to 10,000' | | 3.8 |
| Time to 20,000' | | 8.4 |
| Service ceiling 34,100' | | |

## AIRCRAFT

Duty Reconnaissance

Designation (Saiun) Model 11

Description Low-wing Monoplane

Mfg. Nakajima

Engines 1 Crew 2-3

Construction All Metal

## SPEED

| @ 9920 lbs. | Mph. | Knts. | Altitude |
|---|---|---|---|
| Maximum | 347 | 214 | @ S. L. |
| Maximum | 396 | 344 | @ 16,600' |
| Cruising | | | |
| Economical | | | |

## BOMBS—CARGO

| | No. Size | Total Lbs. |
|---|---|---|
| Normal | None | |
| Maximum | 1 torpedo | 1760 |

## ENGINES

| | H. P. | Altitude |
|---|---|---|
| Take-off WE | 1970 | S.L. |
| Normal | 1840 | 1500' |
| Military | 1875 | 5900' |
| | 1657 | 19700' |
| War Emerg. | 2050 | 2500' |

Mfg. Nakajima

Model Homare 21

Type Radial

Cylinders 18 Cooling Air

Supercharger 2 Speed

Propeller 3-Blade CS Diam. 10.5'

Fuel - Take-off 92 Cruising 92

## WEIGHTS

| | Lbs. |
|---|---|
| Empty | 6340 |
| Gross | 9920 |
| Overload | 11580 |

## FUEL

| | U.S. gal. | Imp. gal. |
|---|---|---|
| Built-in | 358 | 297 |
| Internal (Removable) | | |
| External (drop) | 192 | 160 |
| Maximum | 550 | 457 |

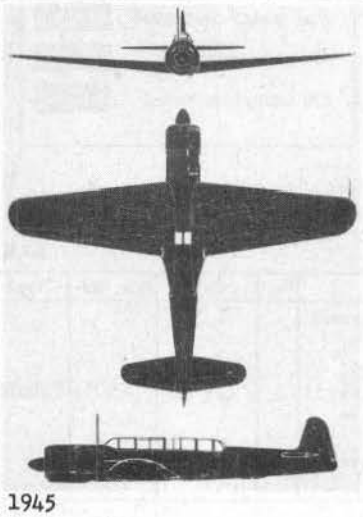
## RANGE AND RADIUS

| | Miles | | Speed | | Alt. feet | Fuel gal. | | Bombs lbs. | Cargo lbs. |
|---|---|---|---|---|---|---|---|---|---|
| | stat. | naut. | mph. | Knts. | | U. S. | Imp. | | |
| Maximum range (maximum fuel) | 2640 | 2290 | 178 | 155 | 1500 | 550 | 457 | None | None |
| Maximum range (normal fuel) | 2105 | 1827 | 239 | 208 | 1500 | 550 | 457 | None | None |
| Radius ( ) | 1815 | 1574 | 175 | 152 | 1500 | 358 | 297 | None | None |
| Radius ( ) | 1410 | 1222 | 243 | 211 | 1500 | 358 | 297 | None | None |

## DIMENSIONS

Span 41.1' Length 36.5'

Height 12.9' Wing area 274 sq.ft.



## GENERAL DATA

MYRT is equipped with one large vertically mounted camera and one hand camera for oblique shots.

This plane will possibly carry one 1760 lb. torpedo.

For further information on MYRT see TAIC Summary No. 24.

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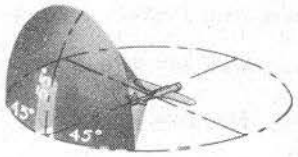
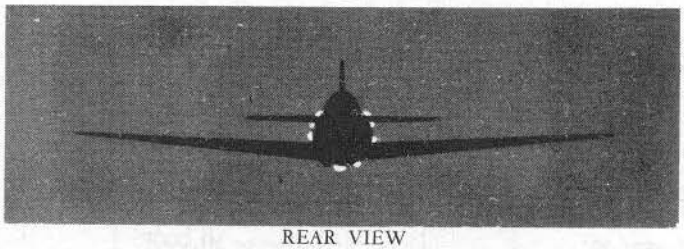
# MYRT 11

## FIELDS OF FIRE



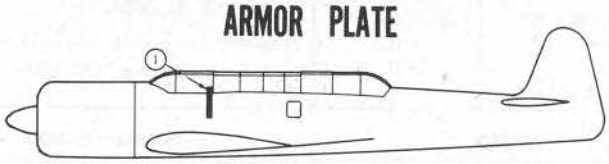

TOP GUN "A" 1 x 7.9 mm.
¾-rear view from above

## EXHAUST FLAME PATTERNS

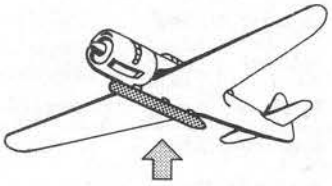


REAR VIEW

## ARMOR PLATE

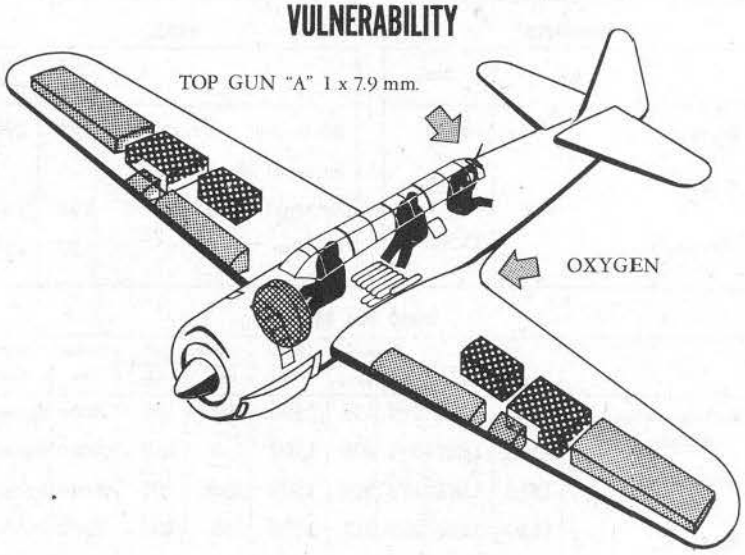


9.5 mm.
1
Viewed from rear



Auxiliary gas tank
Jettisonable

## VULNERABILITY




LEGEND

- Fuel tanks, protected
- Fuel tanks, unprotected
- Oil tanks, protected
- Oil tanks, unprotected

### ARMAMENT

| | No. | Size | Rds. Gun | Type | | No. | Size | Rds. Gun | Type |
|---|---|---|---|---|---|---|---|---|---|
| Forward | | | | | Tail | | | | |
| Top Rear Cockpit Side | 1 | 7.9 mm | 450 | Flexible | Wing | | | | |
| Bottom | | | | | | | | | |

### TACTICAL DATA

Armor plate behind pilot's back only. No protection for pilot's head.

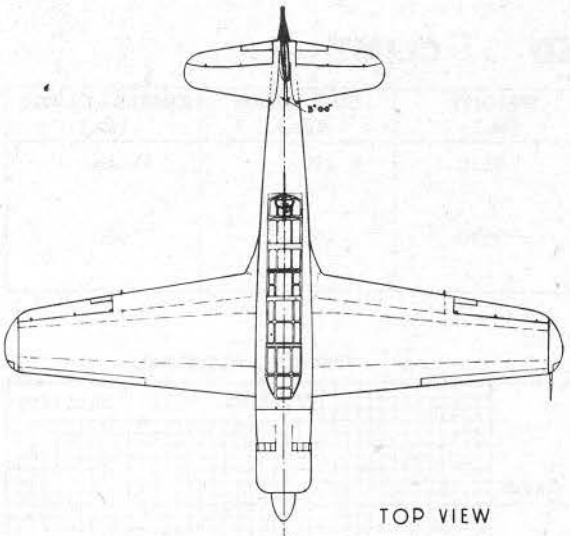
Main wing tanks covered with self-sealing material. Other tanks are equipped with a $CO_2$ system.

**DATE** December 1944

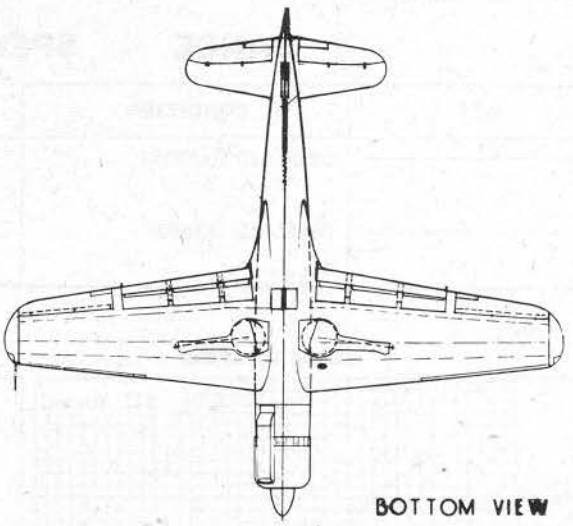
**RESTRICTED**

207A-4

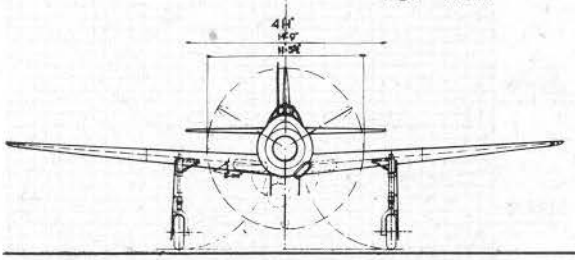
# MYRT 11

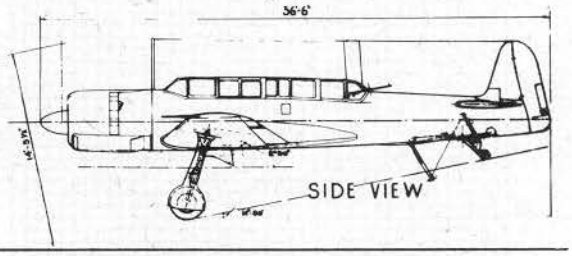


TOP VIEW

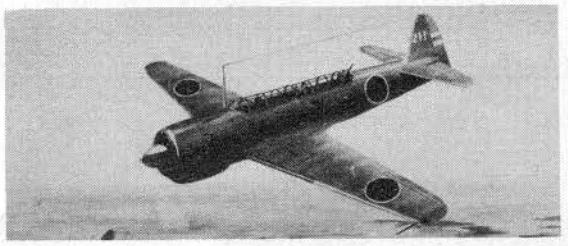


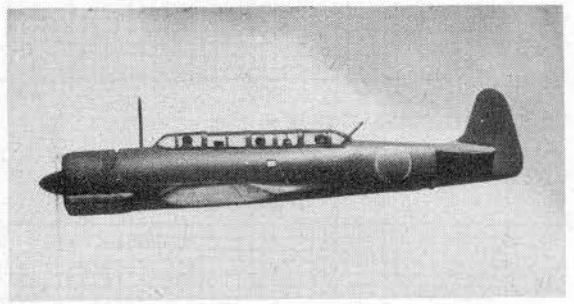
BOTTOM VIEW

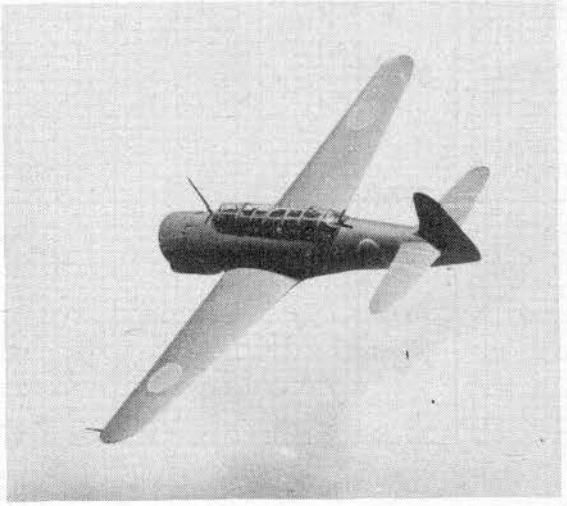


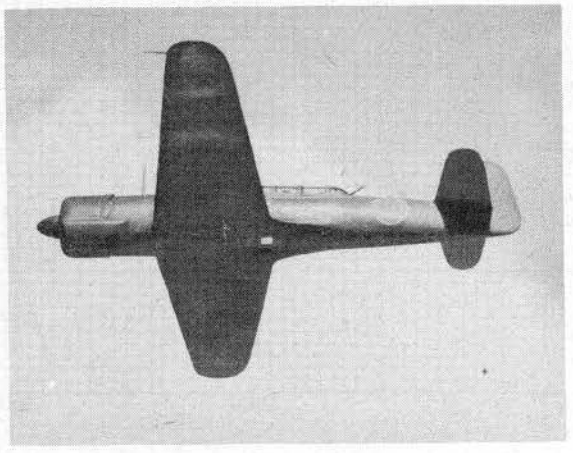


SIDE VIEW









**RESTRICTED**

**DATE** March 1945

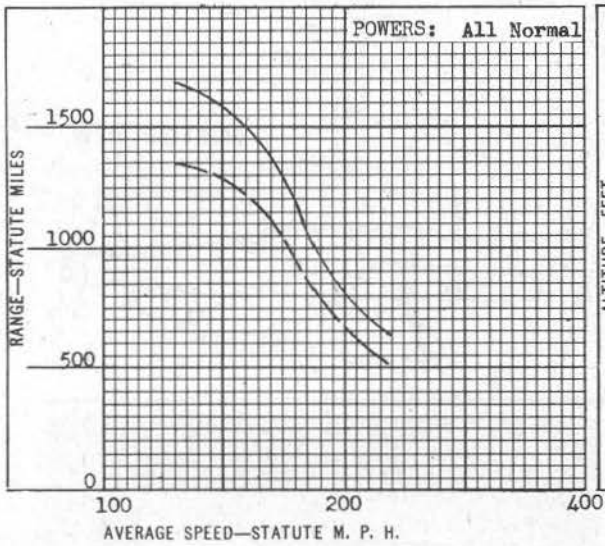
208A-1

# PAUL 11

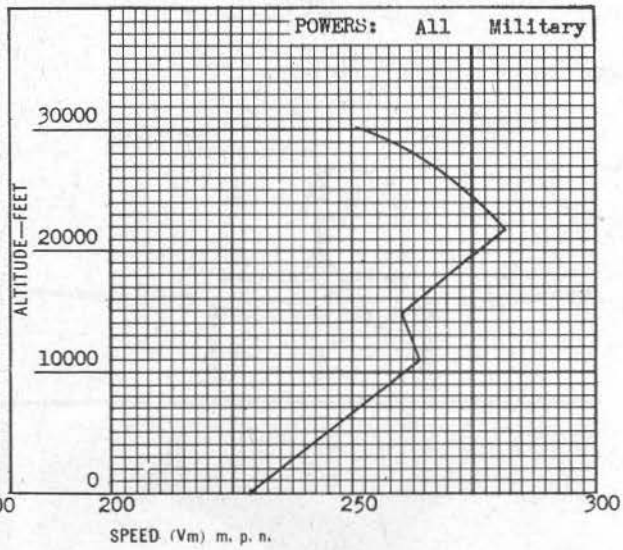
## RANGE * SPEED * CLIMB

| KEY | CONDITION | WEIGHT (lb.) | FUEL LOAD (lb.) | BOMBS—CARGO (lb.) |
|---|---|---|---|---|
| ——— | OVERLOAD PATROL | 9110 | 1902 | None |
| — — — | OVERLOAD BOMBER | 9370 | 1584 | 550 |

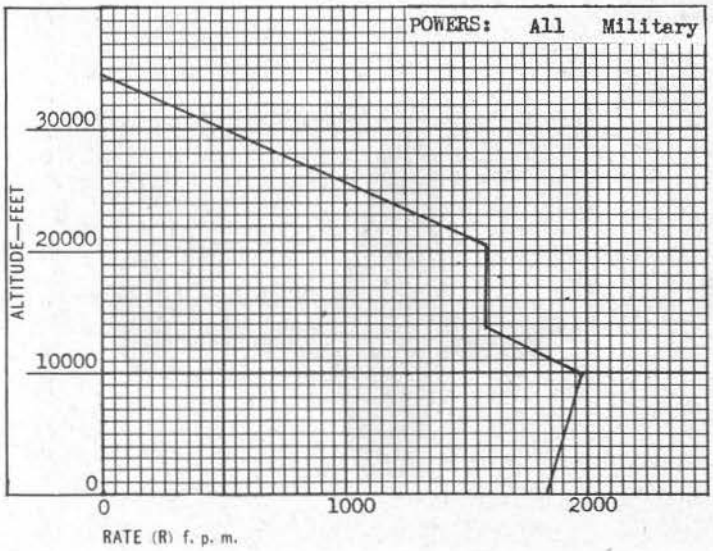
**RANGE VS. SPEED**



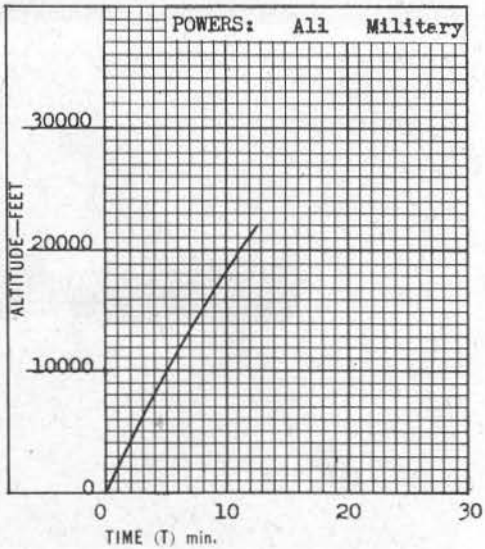

**SPEED VS. ALTITUDE**




**RATE OF CLIMB**




**TIME TO ALTITUDE**




**DATE** December 1944

**RESTRICTED**

# PERFORMANCE AND CHARACTERISTICS

# PAUL 11

### TAKE-OFF

| | Load | Feet |
|---|---|---|
| T.O. calm | | |
| T.O. 25 kt. wind | | |
| T.O. over 50' obstacle | | |
| Landing over 50' obstacle | | |

### CLIMB—CEILING

| @ 9110 lbs. | Feet | Min. |
|---|---|---|
| Rate @ S.L. | 1840 | 1 |
| Rate @ 20,400 ft. | 1590 | 1 |
| Time to 10,000' | | 5.2 |
| Time to 20,000' | | 11.3 |
| Service ceiling 33,500' | | |

### AIRCRAFT

Duty Recco. and Dive Bombing

Designation (ZUIUN) Model 11

Description Twin float low-wing monoplane

Mfg. Aichi

Engines 1 Crew 2

Construction All metal

### SPEED

| @ 9110 lbs. | Mph. | Knts. | Altitude |
|---|---|---|---|
| Maximum | 229 | 198 | @ S. L. |
| Maximum | 282 | 245 | @ 21,700' |
| Cruising 75% | 164 | 142 | 1,500' |
| Economical | | | |

### BOMBS—CARGO

| | No. | Size | Total Lbs. |
|---|---|---|---|
| Normal | None | | |
| Maximum | 2<br>2 | 250 kg.<br>60 kg. | 1388 |

### ENGINES

| | H. P. | Altitude |
|---|---|---|
| Take-off | 1280 | S.L. |
| Normal | 1000<br>910 | 12,000'<br>21,000' |
| Military | 1185 | 9,900' |
| | 1085 | 20,400' |
| War Emerg. | 1355 | 7,700' |

Mfg. Mitsubishi

Model Kinsei 54

Type Radial

Cylinders 14 Cooling Air

Supercharger 2-speed

Propeller 3-Blade C.S. Diam. 10.8'

Fuel - Take-off 92 Cruising 92

### WEIGHTS

| | Lbs. |
|---|---|
| Empty | 5985 |
| Gross (Observation Overload) | 9110 |
| Overload (with bomb) | 9370 |

### FUEL

| | U.S. gal. | Imp. gal. |
|---|---|---|
| Built-in | 264 | 219 |
| Internal (Removable) | 53 | 43 |
| External (drop) | | |
| Maximum | 317 | 262 |

### RANGE AND RADIUS

| | Miles | | Speed | | Alt. | Fuel gal. | | Bombs | Cargo |
|---|---|---|---|---|---|---|---|---|---|
| | stat. | naut. | mph. | Knts. | feet | U. S. | Imp. | lbs. | lbs. |
| Maximum range (maximum fuel) | 1685 | 1465 | 131 | 114 | 1500 | 317 | 262 | None | None |
| @ 75% VM | 1440 | 1245 | 164 | 142 | 1500 | 317 | 262 | None | None |
| Maximum range (normal fuel) | 1345 | 1165 | 132 | 115 | 1500 | 264 | 219 | 550 | None |
| @ 75% VM | 1195 | 1040 | 163 | 141 | 1500 | 264 | 219 | 550 | None |
| Radius ( ) | | | | | | | | | |
| Radius ( ) | | | | | | | | | |

### DIMENSIONS

Span 42' Length 35.6'

Height 15.6' Wing area 302 sq.ft.

### GENERAL DATA

Principal tactical employment expected to be dive bombing. Fitted with double acting "swiss cheese" type dive brakes along the trailing edge of the front strut on each float. In operational service. Performance based on early version; present service model may be modified.

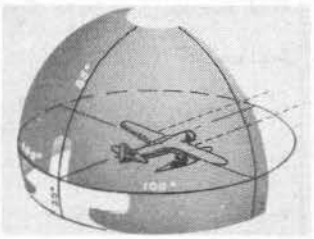
**RESTRICTED**

**DATE** December 1944

208A-3

# PAUL 11

## FIELDS OF FIRE

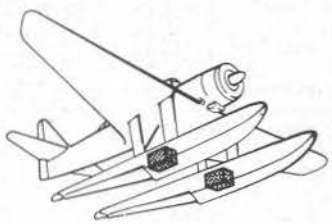


TOP GUN "A"
FORWARD GUNS "B" AND "C"
¾-rear view from above

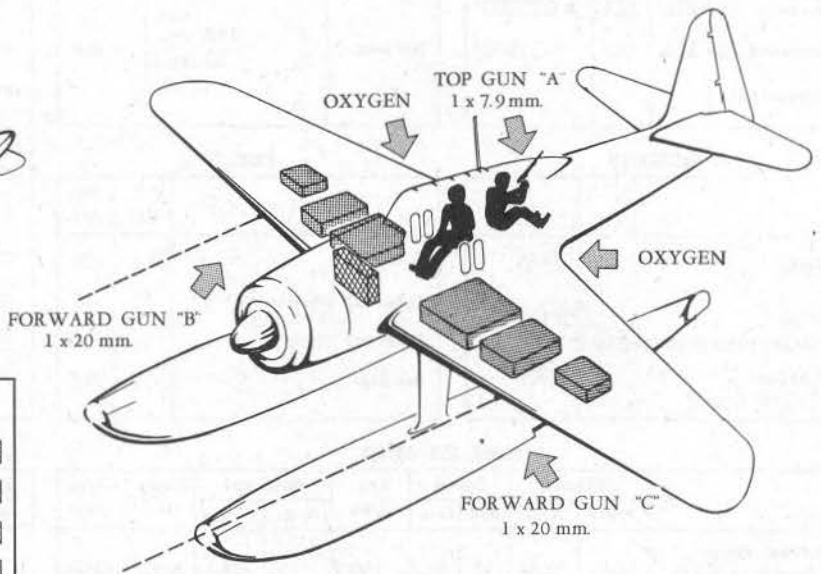
## EXHAUST FLAME PATTERNS

REAR VIEW

## VULNERABILITY



Fuel tanks in Floats




LEGEND

- Fuel tanks, unprotected
- Fuel tanks, protected
- Oil tanks, unprotected
- Oil tanks, protected

### ARMAMENT

| | No. | Size | Rds. Gun | Type | | No. | Size | Rds. Gun | Type |
|---|---|---|---|---|---|---|---|---|---|
| Forward | | | | | Tail | | | | |
| Top | 1 | 7.9 mm | | Flex. | Wing | 2 | 20 mm | 250 belt fed | Fixed |
| Side | | | | | | | | | |
| Bottom | | | | | | | | | |

### TACTICAL DATA

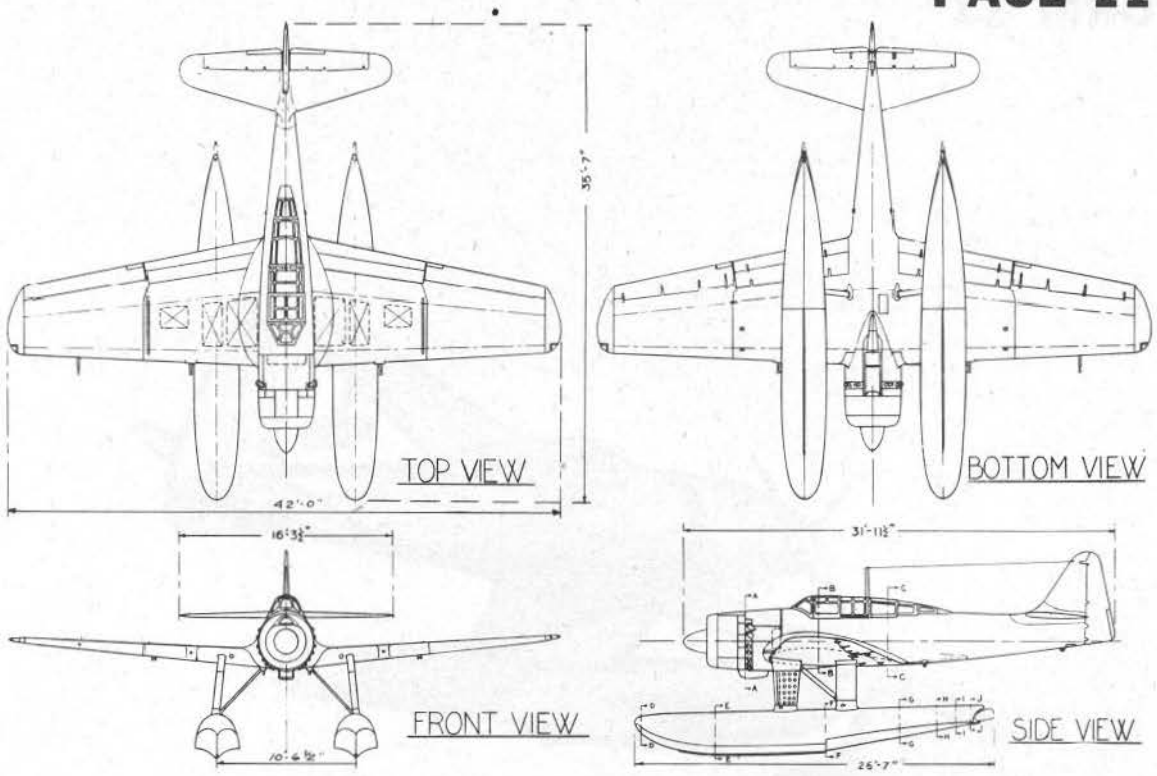
PAUL 11 has neither pilot nor fuel tank protection. It is considered suitable for dive and level bombing.

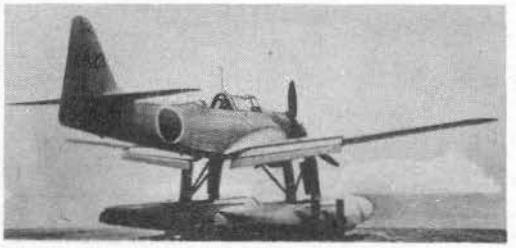
**DATE** March 1945

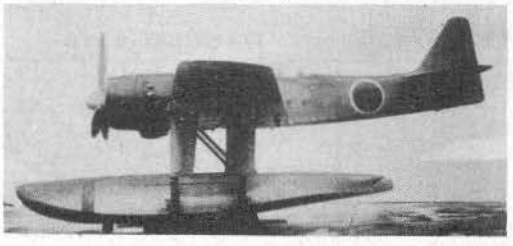
**RESTRICTED**

208A-4

# PAUL 11







**RESTRICTED**

**DATE** March 1945

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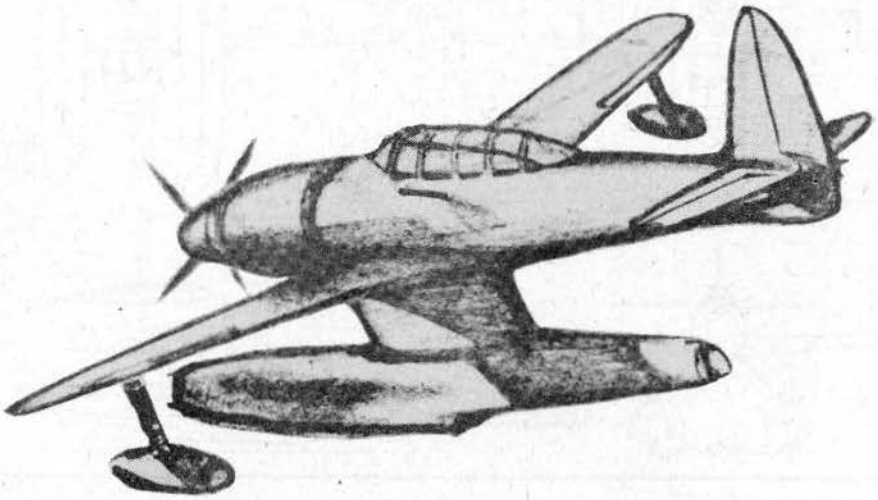
# NORM 11



Provisional Sketch

**ARMAMENT**

| | No. | Size | Rds. Gun | Type | | No. | Size | Rds. Gun | Type |
|---|---|---|---|---|---|---|---|---|---|
| Forward | | | | | Tail | | | | |
| Top | 1 | 7.7 mm | | Flex. | Wing | | | | |
| Side | | | | | | | | | |
| Bottom | | | | | | | | | |

**TACTICAL DATA**

No information.

**DATE** December 1944

**RESTRICTED**

# PERFORMANCE AND CHARACTERISTICS

# NORM 11

## TAKE-OFF

| | Load | Feet |
|---|---|---|
| T.O. calm | | |
| T.O. 25 kt. wind | | |
| T.O. over 50' obstacle | | |
| Landing over 50' obstacle | | |

## CLIMB—CEILING

| @ lbs. | Feet | Min. |
|---|---|---|
| Rate @ S.L. | | |
| Rate @ ft. | | |
| Time to 16,400 | | 8.5 |
| Time to 19,700 | | 10.5 |
| Service ceiling | | |

## AIRCRAFT

Duty High Speed Recce

Designation (SHIUN) Model 11

Description Low-wing Monoplane Single Float

Mfg. Kawanishi

Engines 1 Crew 2

Construction All Metal

## SPEED

| @ lbs. | Mph. | Knts. | Altitude |
|---|---|---|---|
| Maximum | | | @ S. L. |
| Maximum | 319 | 277 | @ 19,686' |
| Cruising 75% | 207 | 180 | |
| Economical | | | |

## BOMBS—CARGO

| | No. | Size | Total Lbs. |
|---|---|---|---|
| Normal | | | |
| Maximum | | | |

## ENGINES

| | H. P. | Altitude |
|---|---|---|
| Take-off | 1825 | S.L. |
| Normal | | |
| Military | 1655<br>1520 | 6,900'<br>18,050' |
| War Emerg. | 1880 | 4,400' |

Mfg. Mitsubishi

Model Kasei 24

Type Radial

Cylinders 14 Cooling Air

Supercharger 2 Speed

Propeller Contra Rotation Diam.

Fuel - Take-off 92 Cruising 92 plus methanol

## WEIGHTS

| | Lbs. |
|---|---|
| Empty | 9020 |
| Gross | 10780 |
| Overload | |

## FUEL

| | U.S. gal. | Imp. gal. |
|---|---|---|
| Built-in | | |
| Internal (Removable) | | |
| External (drop) | | |
| Maximum | | |

## RANGE AND RADIUS

| | Miles | | Speed | | Alt. | Fuel gal. | | Bombs | Cargo |
|---|---|---|---|---|---|---|---|---|---|
| | stat. | naut. | mph. | Knts. | feet | U. S. | Imp. | lbs. | lbs. |
| Maximum range (maximum fuel) | 2465 | 2140 | | | | | | | |
| Maximum range (normal fuel) | | | | | | | | | |
| Radius ( ) | | | | | | | | | |
| Radius ( ) | | | | | | | | | |

## DIMENSIONS

Span 45.8' Length 37.6'

Height 16.3' Wing area sq.ft.

## GENERAL DATA

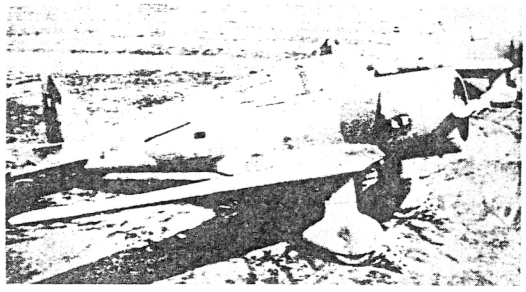
NORM (SHIUN) is a high speed reconnaissance float plane believed to be manufactured by Kawanishi and scheduled for production at the end of 1943.

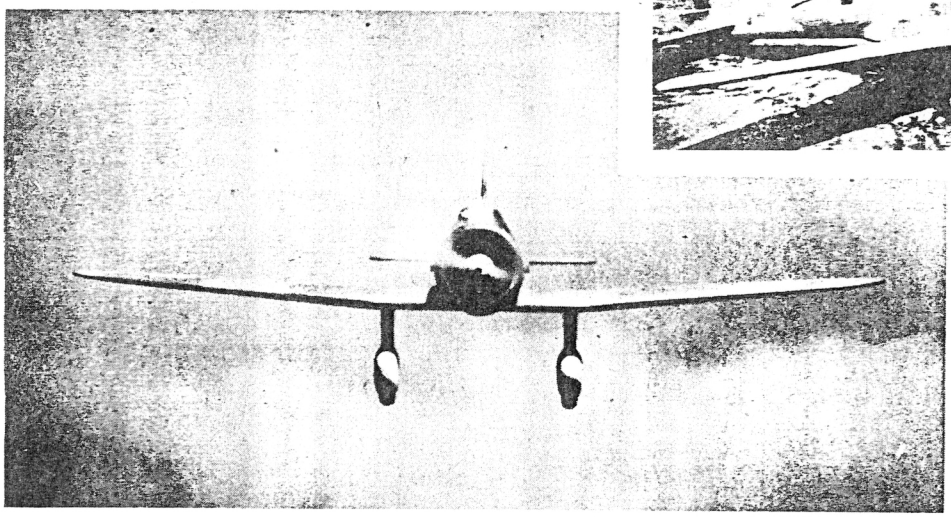
Additional fuel tanks are provided in the main float.

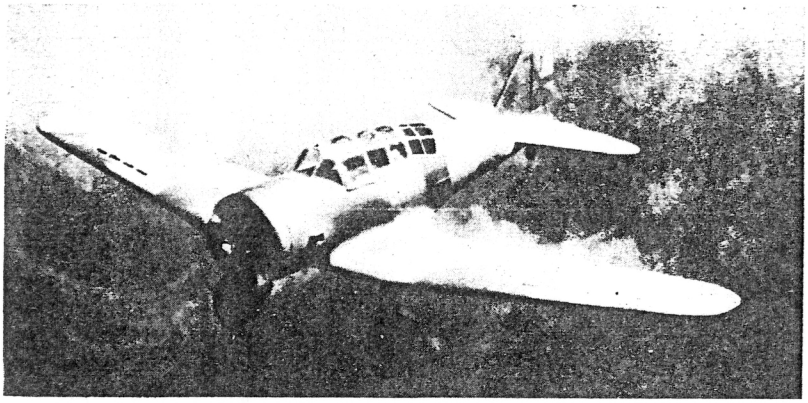
Reported to be able to jettison floats and increase maximum speed.

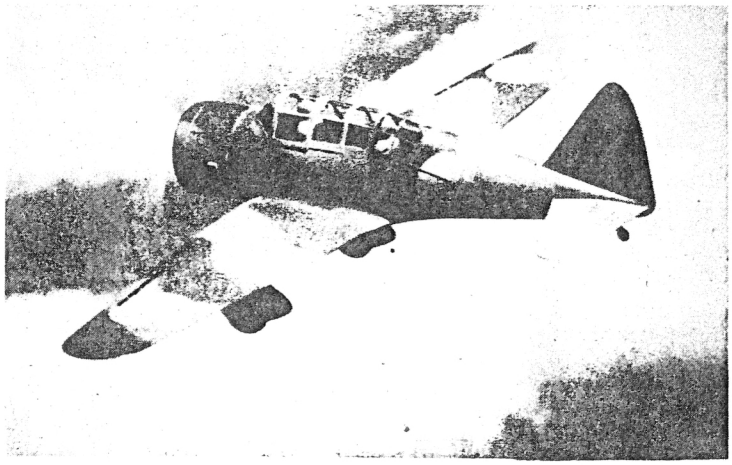
251A-1

# IDA 1









RESTRICTED

DATE July 1945

# PERFORMANCE AND CHARACTERISTICS

# IDA 1

## TAKE-OFF

| | Load | Feet |
|---|---|---|
| T.O. calm | | |
| T.O. 25 kt. wind | | |
| T.O. over 50' obstacle | | |
| Landing over 50' obstacle | | |

## CLIMB—CEILING

| @ 3661 lbs. | Feet | Min. |
|---|---|---|
| Rate @ S.L. | | |
| Rate @ ft. | | |
| Time to | | |
| Time to | | |
| Service ceiling 26,700 | | |

## AIRCRAFT

Duty Direct Coop Recco

Designation Type 98 (Ki 36)

Description Low wing monoplane
Fixed landing gear

Mfg. Kawasaki & Tachikawa

Engines 1 Crew 2

Construction All Metal

## SPEED

| Suicide Condition | Mph. | Knts. | Altitude |
|---|---|---|---|
| Max. with 1 x 250 kg bomb | 203 | 176 | @ 4,920' |
| Max. with 1 x 500 kg bomb | 195 | 169 | 4,920' |
| Diving | 264 | 229 | |

## BOMBS—CARGO

| | No. Size | Total Lbs. |
|---|---|---|
| Normal | 10 x 15 kg | 330 |
| Maximum (Suicide) | 1 x 500 kg | 1100 |

## ENGINES

| | H. P. | Altitude |
|---|---|---|
| Take-off | 510 | S.L. |
| Normal | 340 | 1500' |
| Military | 470 | 4920' |
| War Emerg. | | |

Mfg. Hitachi & Kawasaki

Model Ha 23 Mod. 22

Type Radial

Cylinders 9 Cooling Air

Supercharger Single speed

Propeller 2 Blade Diam. 8.2

Fuel - Take-off 87 Cruising 87

## WEIGHTS

| | Lbs. |
|---|---|
| Empty | 2751 |
| Gross | 3661 |
| Suicide Overload | |
| 1 x 250 kg. bomb | 3828 |
| 1 x 500 kg. bomb | 4272 |

## FUEL

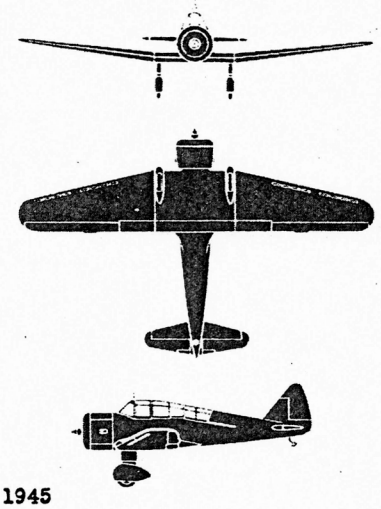
| | U.S. gal. | Imp. gal. |
|---|---|---|
| Built-in | 89 | 74 |
| Internal (Removable) | | |
| External (drop) | | |
| Maximum | 89 | 74 |

## RANGE AND RADIUS

| Suicide Cond. | Miles stat. | Miles naut. | Speed mph. | Speed Knts. | Alt. feet | Fuel gal. U. S. | Fuel gal. Imp. | Bombs lbs. | Cargo lbs. |
|---|---|---|---|---|---|---|---|---|---|
| Maximum range | 995 | 865 | 100 | 87 | 1500 | 89 | 74 | 550 | None |
| R @ Combat Cr. | 340 | 295 | 176 | 153 | 1500 | 89 | 74 | 550 | None |
| Maximum range | 850 | 740 | 98 | 85 | 1500 | 71 | 59 | 1100 | None |
| R @ Combat Cr. | 260 | 226 | 169 | 147 | 1500 | 71 | 59 | 1100 | None |
| Radius ( ) | | | | | | | | | |

## DIMENSIONS

Span 38.7' Length 26.2'
Height 10.8' Wing area 215 sq.ft.



## GENERAL DATA

Suicide Conditions - The assumption is made that the above bomb loads can be secured to the aircraft externally.

Armament - 1 x 7.7 mm Type 89 Fixed, firing thru prop
1 x 7.7 mm Type 89 Flexible, firing from rear cockpit.

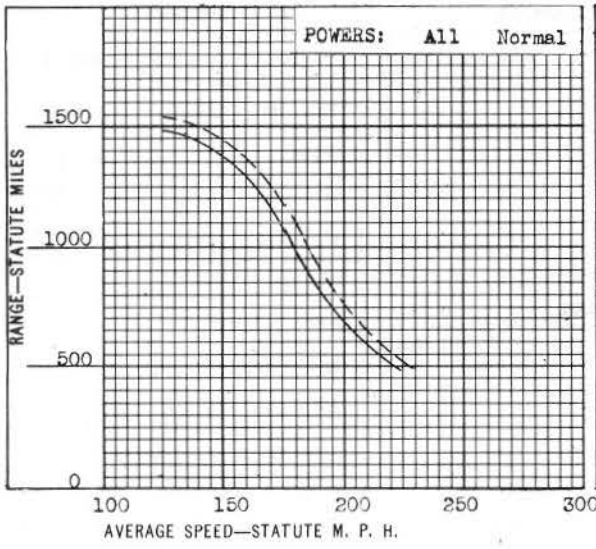
252A-1

# SONIA 1

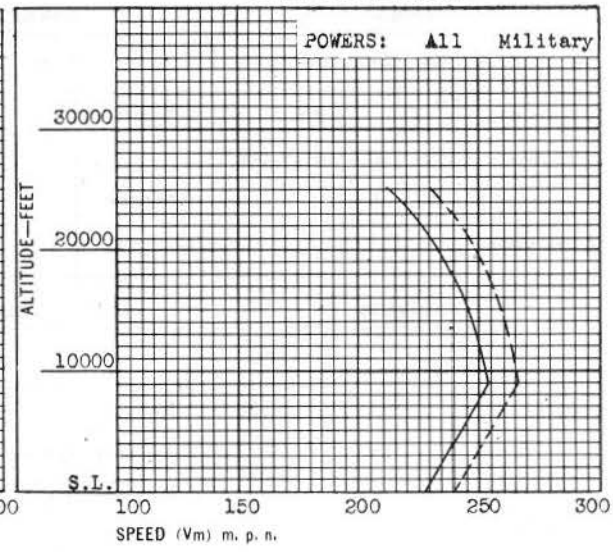
## RANGE • SPEED • CLIMB

| KEY | CONDITION | WEIGHT (lb.) | FUEL LOAD (lb.) | BOMBS—CARGO (lb.) |
|---|---|---|---|---|
| ——— | BOMBER | 6495 | 1224 | 529 |
| – – – – – – – | SCOUT | 5940 | 1224 | None |

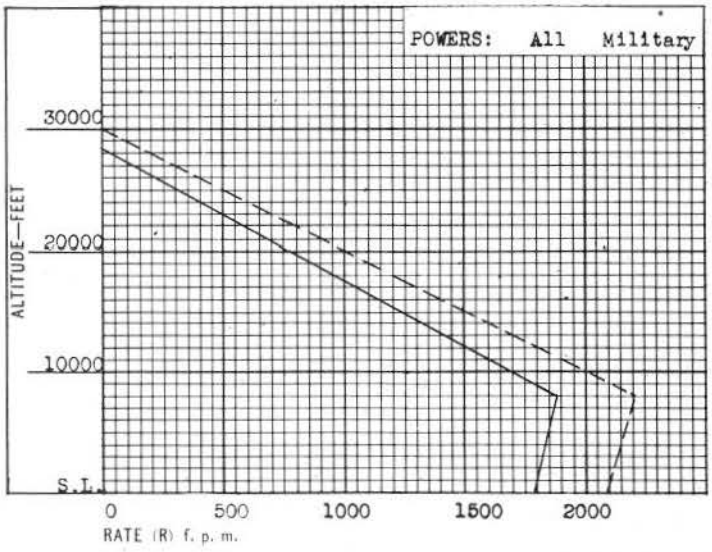
**RANGE VS. SPEED**



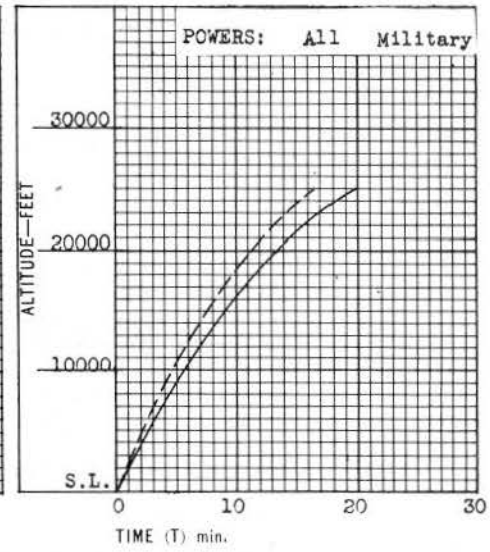

**SPEED VS. ALTITUDE**




**RATE OF CLIMB**




**TIME TO ALTITUDE**



# PERFORMANCE AND CHARACTERISTICS

# SONIA 1

### TAKE-OFF

| | Load | Feet |
|---|---|---|
| T.O. calm | 6495 | 682 |
| T.O. 25 kt. wind | 6495 | 276 |
| T.O. over 50' obstacle | | |
| Landing over 50' obstacle | | |

### CLIMB—CEILING

| @ 6495 lbs. | Feet | Min. |
|---|---|---|
| Rate @ S.L. | 1790 | 1 |
| Rate @ 8,000 ft. | 1885 | 1 |
| Time to 10,000' | | 5.5 |
| Time to 20,000' | | 13.4 |
| Service ceiling 27,200' | | |

### AIRCRAFT

Duty Attack & Reconnaissance

Designation Type 99, Ki 51

Description Low-wing
Fixed Landing Gear

Mfg. Mitsubishi

Engines 1 Crew 2

Construction

### SPEED

| @6495 lbs. | Mph. | Knts. | Altitude |
|---|---|---|---|
| Maximum | 228 | 197 | @ S. L. |
| Maximum | 254 | 220 | @9,000' |
| Cruising 75% | 168 | 145 | 1,500' |
| Economical | | | |

### BOMBS—CARGO

| | No. | Size | Total Lbs. |
|---|---|---|---|
| Normal | 4 | 60 kg. | 528 |
| Maximum | | | |

### ENGINES

| | H. P. | Altitude |
|---|---|---|
| Take-off | 930 | S.L. |
| Normal | | |
| Military | 850<br>910 | S.L.<br>8,000' |
| War Emerg. | 990 | 7,500' |

Mfg. Mitsubishi

Model Type 99, Model 2
900 h.p.

Type Radial

Cylinders 14 Cooling Air

Supercharger Single Speed

Propeller 3 Blade Diam. 9.7'
C.S.

Fuel - Take-off Cruising

### WEIGHTS

| | Lbs. |
|---|---|
| Empty | 4125 |
| Gross (Reconnaissance | 5940 |
| Bomber) | 6495 |
| Overload | |

### FUEL

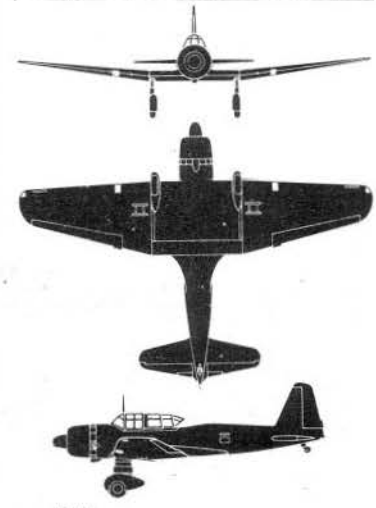
| | U.S. gal. | Imp. gal. |
|---|---|---|
| Built-in | 204 | 169 |
| Internal (Removable) | | |
| External (drop) | | |
| Maximum | 204 | 169 |

### RANGE AND RADIUS

| | Miles | | Speed | | Alt. feet | Fuel gal. | | Bombs lbs. | Cargo lbs. |
|---|---|---|---|---|---|---|---|---|---|
| | stat. | naut. | mph. | Knts. | | U. S. | Imp. | | |
| Maximum range Reconnaissance | 1540 | 1337 | 126 | 109 | 1500 | 204 | 169 | None | None |
| At 75% Vmax. | 1225 | 1064 | 172 | 149 | 1500 | 204 | 169 | None | None |
| Maximum range Bomber | 1445 | 1263 | 125 | 108 | 1500 | 204 | 169 | 528 | None |
| At 75% Vmax. | 1180 | 1024 | 168 | 145 | 1500 | 204 | 169 | 528 | None |
| Radius ( ) | | | | | | | | | |
| Radius ( ) | | | | | | | | | |

### DIMENSIONS

Span 39.8' Length 27.8'
Height Wing area 260 sq.ft.



### GENERAL DATA

Although obsolescent, SONIA is still reported in sightings.

Maximum ranges are given both in reconnaissance and bomber conditions. SONIA may carry a 30-40 gallon Jettisonable belly tank.

**RESTRICTED**

**DATE** December 1944

252A-3

# SONIA 1

Vulnerability, Fields of Fire, etc.

ARMAMENT

| | No. | Size | Rds. Gun | Type | | No. | Size | Rds. Gun | Type |
|---|---|---|---|---|---|---|---|---|---|
| Forward | | | | | Tail | | | | |
| Top | | | | | Wing | 2 | 7.7 mm | | Fixed |
| Rear Cockpit | 1 | 7.7 mm | | Flexible | | | | | |
| Side | | | | | | | | | |
| Bottom | | | | | | | | | |

TACTICAL DATA

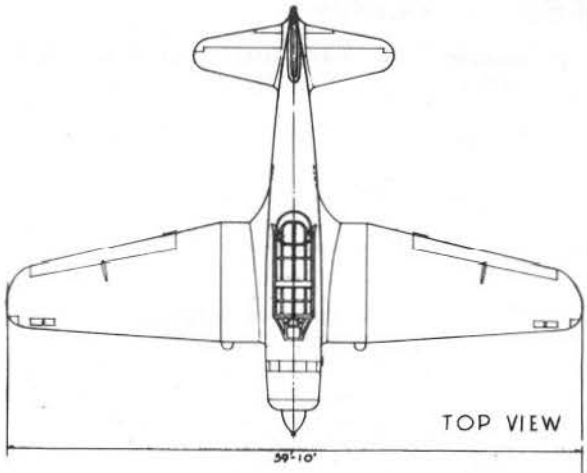
SONIA is known to have carried armor under the forward fuselage for the protection of fuel and oil lines, oil tank, and the pilot, probably only in attack version.

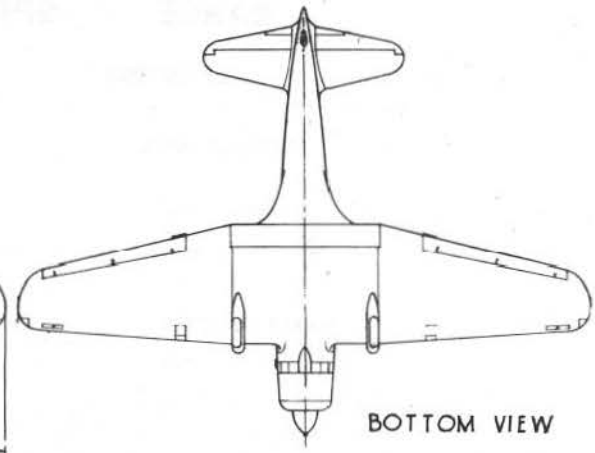
DATE December 1944

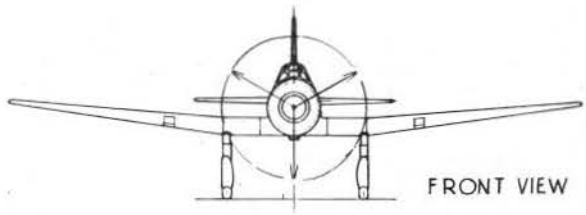
RESTRICTED

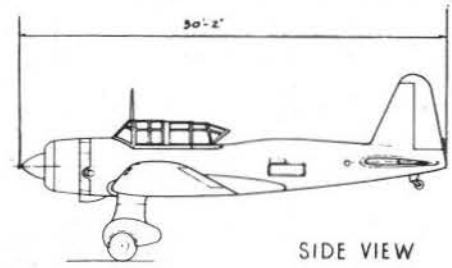
252A-4

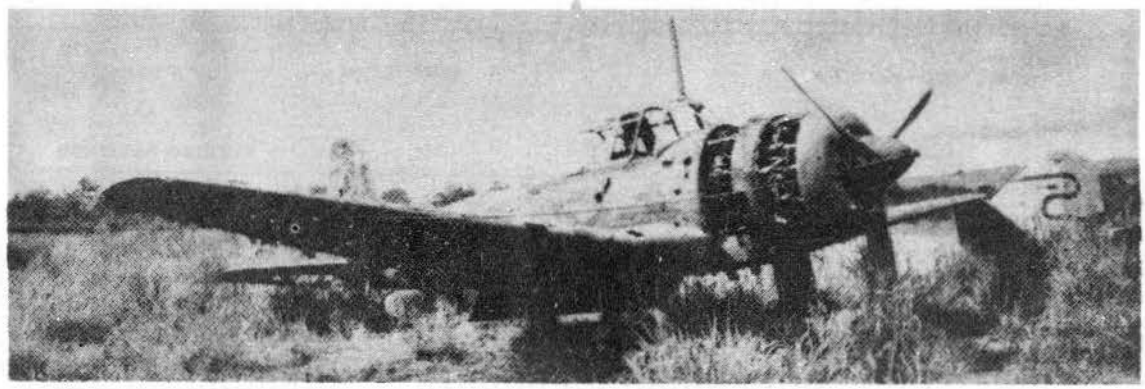
# SONIA 1

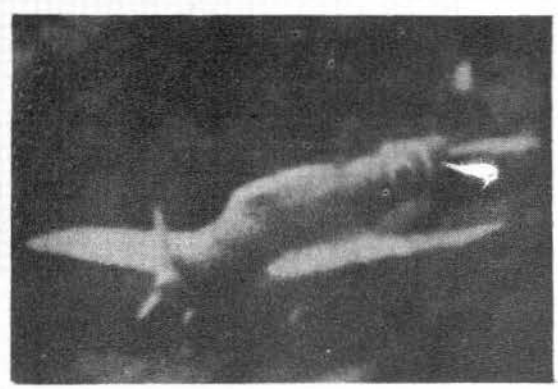




**RESTRICTED**

**DATE** December 1944

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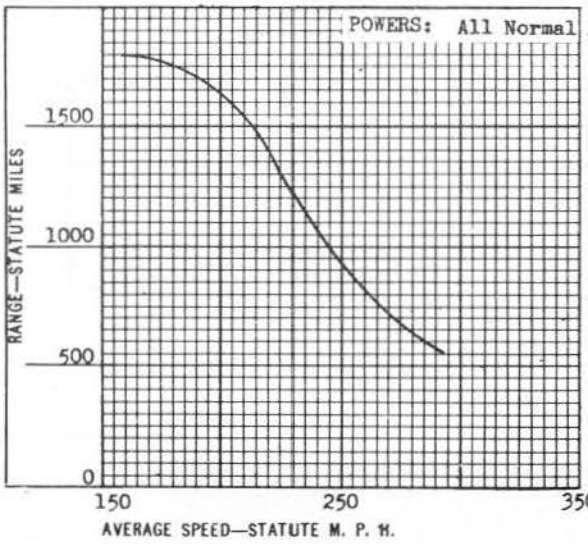
# DINAH 2

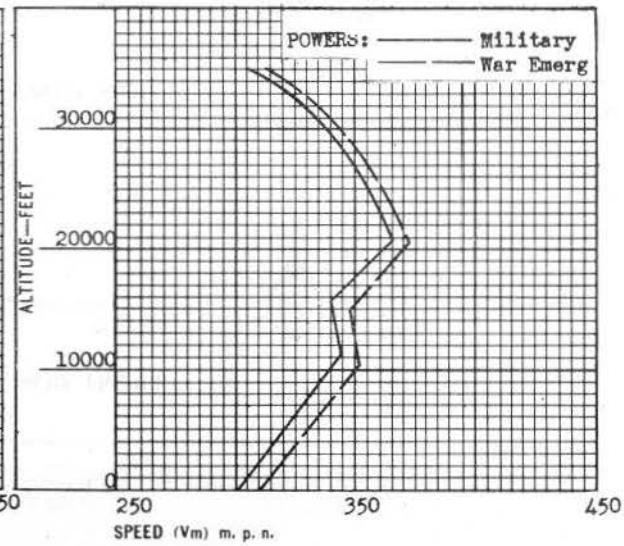
## RANGE • SPEED • CLIMB

| KEY | CONDITION | WEIGHT (lb.) | FUEL LOAD (lb.) | BOMBS—CARGO (lb.) |
|---|---|---|---|---|
| ——— | RECONNAISSANCE | 11882 | 2628 | None |
| — — — | RECONNAISSANCE | 11882 | 2628 | None |

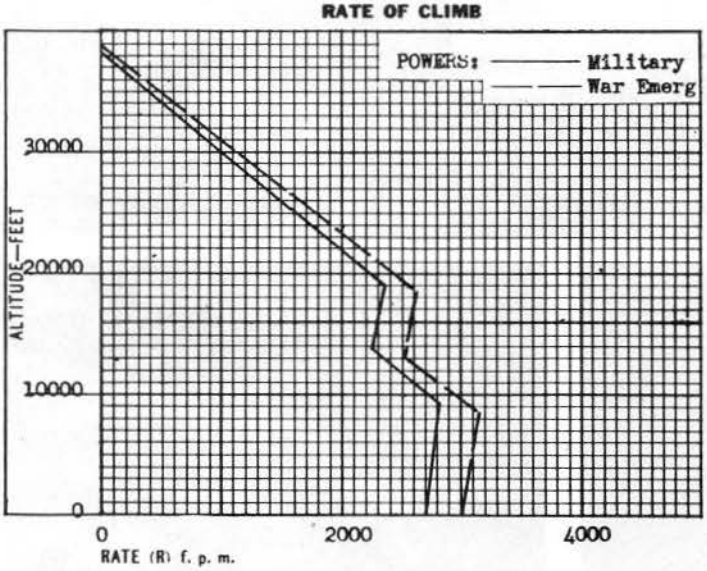
**RANGE VS. SPEED**



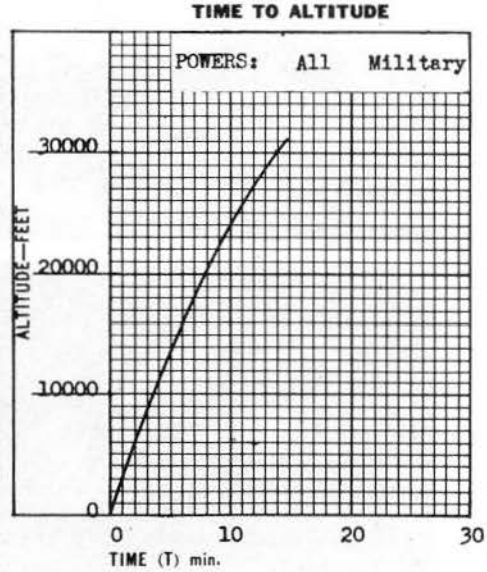

**SPEED VS. ALTITUDE**




**RATE OF CLIMB**




**TIME TO ALTITUDE**




**DATE** December 1944

**RESTRICTED**

# PERFORMANCE AND CHARACTERISTICS

# DINAH 2

## TAKE-OFF

| | Load | Feet |
|---|---|---|
| T.O. calm | 11,882 | 656 |
| T.O. 25 kt. wind | 11,882 | 299 |
| T.O. over 50' obstacle | | |
| Landing over 50' obstacle | | |

## CLIMB—CEILING

| @ lbs. | Feet | Min. |
|---|---|---|
| Rate @ S.L. | 2700 | 1 |
| War Emerg. | 3010 | 1 |
| Rate @ 19,000 ft. | 2355 | 1 |
| W. E. @ 18,500' | 2630 | 1 |
| Time to 10,000' | | 3.6 |
| Time to 20,000' | | 7.9 |
| Service ceiling | 37,400' | |

## AIRCRAFT

Duty Reconnaissance

Designation Type 100, Model 2

Description Low-wing monoplane

Mfg. Mitsubishi

Engines 2 Crew 2

Construction All metal

## SPEED

| @ lbs. | Mph. | Knts. | Altitude |
|---|---|---|---|
| Maximum | 301 | 261 | @ S. L. |
| War Emerg. | 310 | 269 | @ S.L. |
| Maximum | 365 | 317 | @ 21,000' |
| War Emerg. | 372 | 322 | 20,500' |
| Cruising 75% | 219 | 190 | 1,500' |
| Economical | | | |

## BOMBS—CARGO

| | No. Size | Total Lbs. |
|---|---|---|
| Normal | None | |
| Maximum | | |

## ENGINES

| | H. P. | Altitude |
|---|---|---|
| Take-off | 1065 | S.L. |
| W.E. | 1135 | 8,500' |
| ~~Normal~~ | 1020 | 18,000' |
| Military | 1040 | 9,200' |
| War Emerg. | 935 | 19,000' |

Mfg. Mitsubishi

Model Type 1, 1050 HP

Type Radial

Cylinders 14 Cooling Air

Supercharger 2-speed

Propeller 3-Blade C.S. Diam. 9.8'

Fuel - Take-off 92 Cruising 92

## WEIGHTS

| | Lbs. |
|---|---|
| Empty | 8,058 |
| Gross | 11,882 |
| Overload | |

## FUEL

| | U.S. gal. | Imp. gal. |
|---|---|---|
| Built-in | 438 | 364 |
| Internal (Removable) | | |
| External (drop) | | |
| Maximum | 438 | 364 |

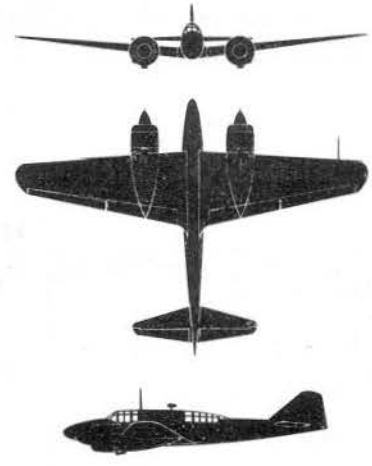
## RANGE AND RADIUS

| | Miles | | Speed | | Alt. feet | Fuel gal. | | Bombs lbs. | Cargo lbs. |
|---|---|---|---|---|---|---|---|---|---|
| | stat. | naut. | mph. | Knts. | | U. S. | Imp. | | |
| Maximum range (maximum fuel) | | | | | | | | | |
| Maximum range (normal fuel) | 1795 | 1555 | 158 | 136 | 1500 | 438 | 364 | None | None |
| @ 75% VM | 1405 | 1220 | 219 | 190 | 1500 | 438 | 364 | None | None |
| Radius ( ) | | | | | | | | | |
| Radius ( ) | | | | | | | | | |

## DIMENSIONS

Span 48.3' Length 36.3'

Height Wing area 352 sq.ft.



## GENERAL DATA

Speed and climb figures are for military power except where indicated as War Emergency.

Armament and appearance of DINAH 2 are equivalent to DINAH 3.

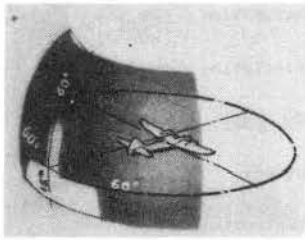


DATE December 1944

253A-3

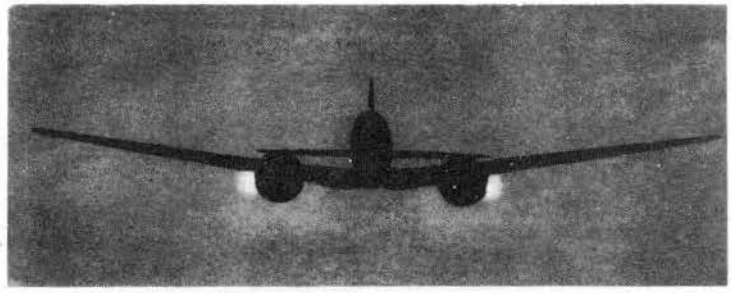
# DINAH 2

## FIELDS OF FIRE



TOP GUN "A" 1 x 7.7 mm.
¾-rear view from above

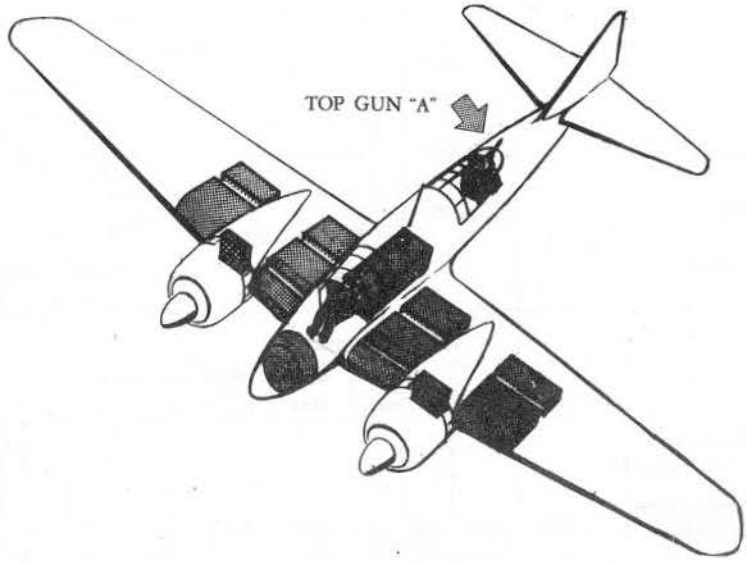
## EXHAUST FLAME PATTERNS



REAR VIEW

## VULNERABILITY

No information on other guns




LEGEND

- Fuel tanks, unprotected
- Fuel tanks, protected
- Oil tanks, unprotected
- Oil tanks, protected

### ARMAMENT

| | No. | Size | Rds. Gun | Type | | No. | Size | Rds. Gun | Type |
|---|---|---|---|---|---|---|---|---|---|
| Forward | | | | | Tail | | | | |
| Top Rear Cockpit Side | 1 | 7.7 mm | | Flex. | Wing | | | | |
| Bottom | | | | | | | | | |

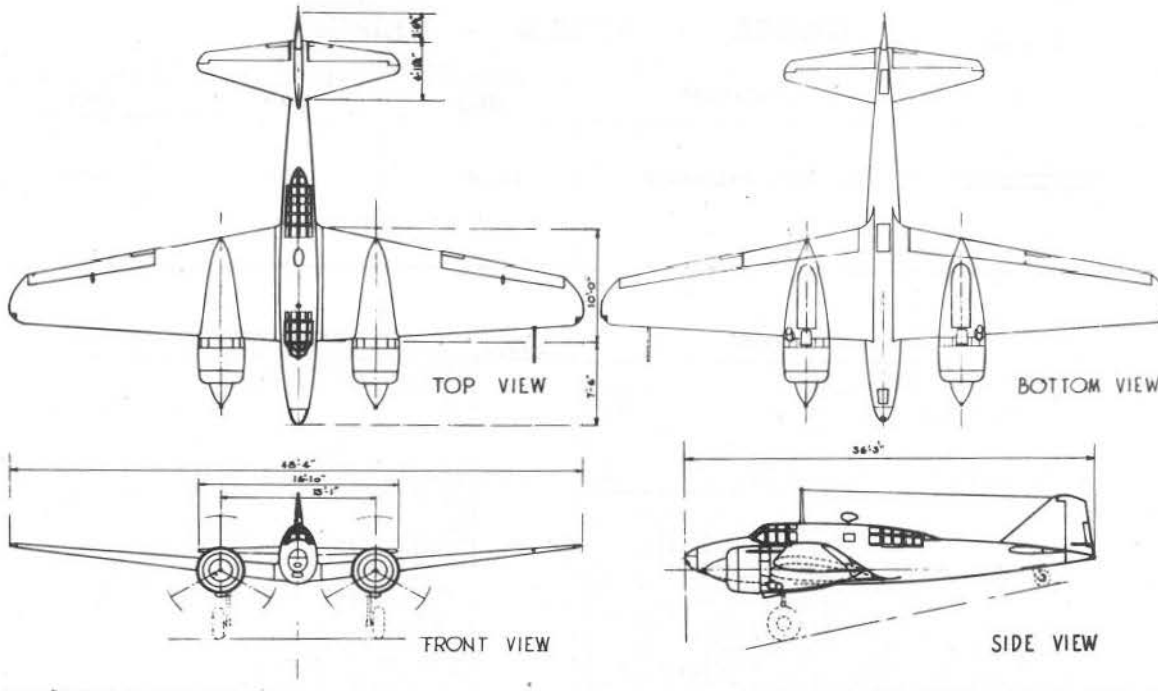
### TACTICAL DATA

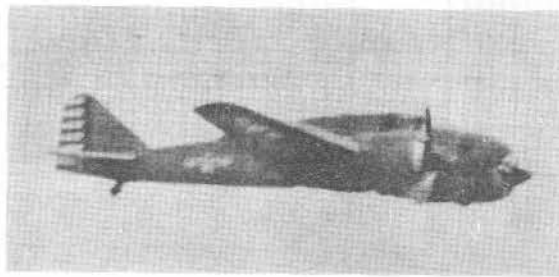
Maximum armament recovered has been 1 x 7.7 mm top rear free gun. One report indicated 2 x 7.7 free guns. Has used grenade discharge device.

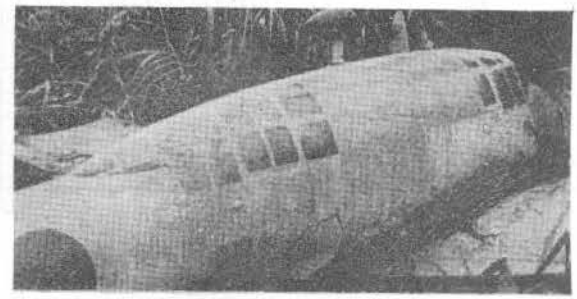
**DATE** December 1944

**RESTRICTED**

# DINAH 2





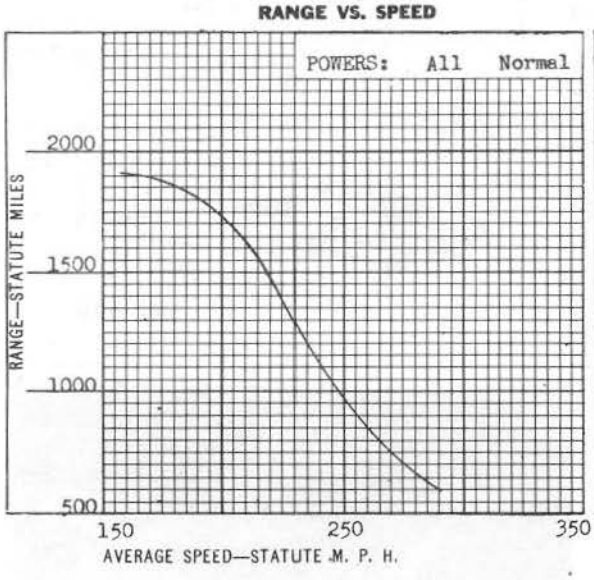


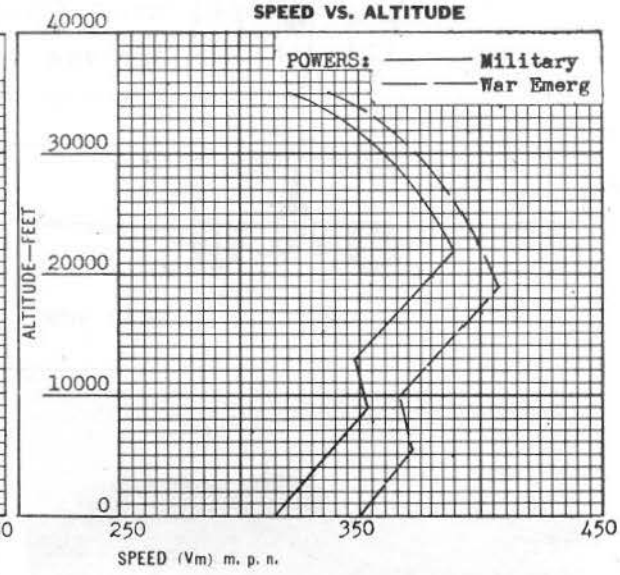
253B-1

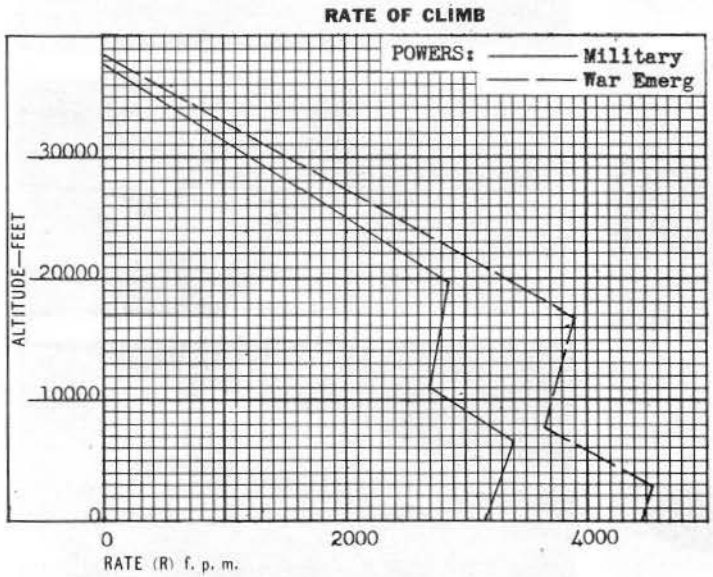
# DINAH 3

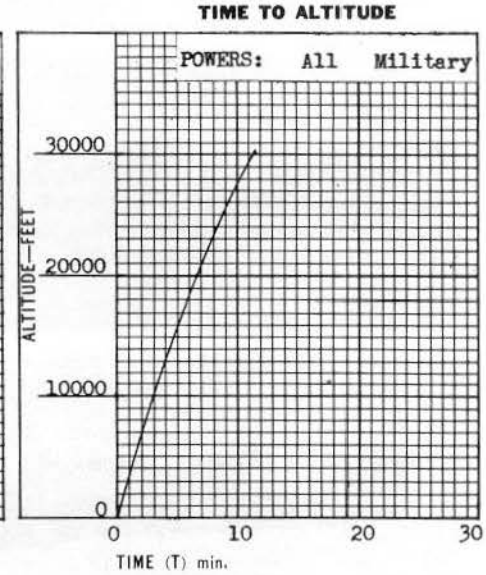
## RANGE • SPEED • CLIMB

| KEY | CONDITION | WEIGHT (lb.) | FUEL LOAD (lb.) | BOMBS—CARGO (lb.) |
|---|---|---|---|---|
| ——— — — — — | NORMAL RECONNAISSANCE | 12405 | 2994 | None |




**DATE** December 1944

**RESTRICTED**

# PERFORMANCE AND CHARACTERISTICS

# DINAH 3

## TAKE-OFF

| | Load | Feet |
|---|---|---|
| T.O. calm | 12,405 | 791 |
| T.O. 25 kt. wind | 12,405 | 370 |
| T.O. over 50' obstacle | | |
| Landing over 50' obstacle | | |

## CLIMB—CEILING

| @ 12,405 lbs. | Feet | Min. |
|---|---|---|
| Rate @ S.L. | 3170 | 1 |
| Rate @ 19,700 ft. | 3400 | 1 |
| Time to 10,000' | | 3.1 |
| Time to 20,000' | | 6.7 |
| Service ceiling 37,800' | | |

## AIRCRAFT

Duty Reconnaissance

Designation Type 100, Model 3

Description Low-wing monoplane

Mfg. Mitsubishi

Engines 2 Crew 2

Construction All metal

## SPEED

| @ 12405 lbs. | Mph. | Knts. | Altitude |
|---|---|---|---|
| Maximum | 317 | 275 | @ S.L. |
| War Emerg. | 350 | 304 | @ S.L. |
| Maximum | 390 | 339 | @ 22,000' |
| War Emerg. | 407 | 353 | @ 19,300' |
| Cruising 75% | 219 | 190 | 1,500' |
| Economical | | | |

## BOMBS—CARGO

| | No. | Size | Total Lbs. |
|---|---|---|---|
| Normal | None | | |
| Maximum | | | |

## ENGINES

| | H. P. | Altitude |
|---|---|---|
| Take-off | 1580 | S.L. |
| Normal | | |
| Military | 1280 | 6,700' |
| | 1185 | 19,700' |
| War Emerg. | 1470 | 4,000' |
| | 1340 | 17,000' |

Mfg. Mitsubishi

Model Ha 112, Model 2

Type Radial

Cylinders 14 Cooling Air

Supercharger 2-speed

Propeller 3-Blade C.S Diam. 9.8'

Fuel - Take-off 92 Cruising 92 and methanol

## WEIGHTS

| | Lbs. |
|---|---|
| Empty | 8215 |
| Gross | 12405 |
| Overload | |

## FUEL

| | U.S. gal. | Imp. gal. |
|---|---|---|
| Built-in | 499 | 415 |
| Internal (Removable) | | |
| External (drop) | | |
| Maximum | 499 | 415 |

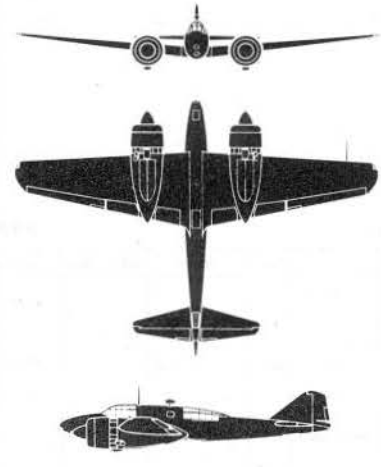
## RANGE AND RADIUS

| | Miles | | Speed | | Alt. | Fuel gal. | | Bombs | Cargo |
|---|---|---|---|---|---|---|---|---|---|
| | stat. | naut. | mph. | Knts. | feet | U. S. | Imp. | lbs. | lbs. |
| Maximum range (maximum fuel) | | | | | | | | | |
| Maximum range (normal fuel) | 1915 | 1663 | 158 | 137 | 1500 | 499 | 415 | None | None |
| At 75% Vmax. Radius ( ) | 1495 | 1299 | 219 | 190 | 1500 | 499 | 415 | None | None |
| Radius ( ) | | | | | | | | | |

## DIMENSIONS

Span 48.3' Length 36.3'

Height Wing area 352 sq.ft.



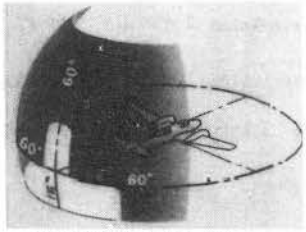
## GENERAL DATA

Speed and climb figures are with Military Power unless indicated as War Emergency Power.

Two cameras are located in the observer's cockpit section. One large camera is mounted for vertical shots while the other, smaller one is used for obliques. DINAH 3 is an exceptionally fast reconnaissance aircraft.

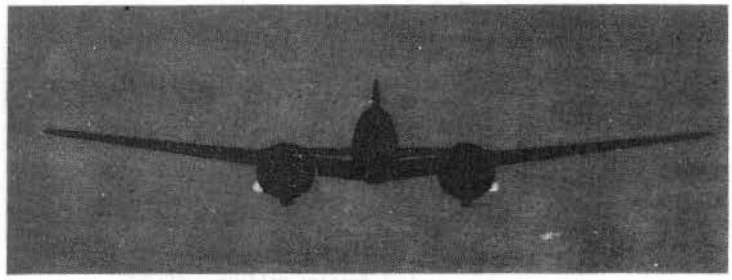
# DINAH 3

## FIELDS OF FIRE



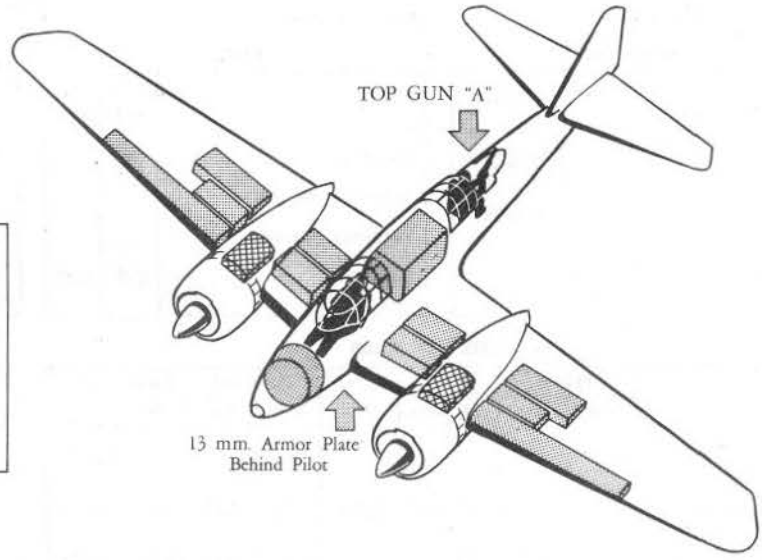

TOP GUN "A" 1 x 7.7 mm.
OR 2 x 7.7 mm.
¾-rear view from above.

## EXHAUST FLAME PATTERNS



REAR VIEW

## VULNERABLITY




LEGEND

- Fuel tanks, unprotected
- Fuel tanks, protected
- Oil tanks, unprotected
- Oil tanks, protected

## ARMAMENT

| | No. | Size | Rds. Gun | Type | | No. | Size | Rds. Gun | Type |
|---|---|---|---|---|---|---|---|---|---|
| Forward | | | | | Tail | | | | |
| Top Rear Cockpit | 1 | 7.7 mm | | Flex. | Wing | | | | |
| Bottom | | | | | | | | | |

## TACTICAL DATA

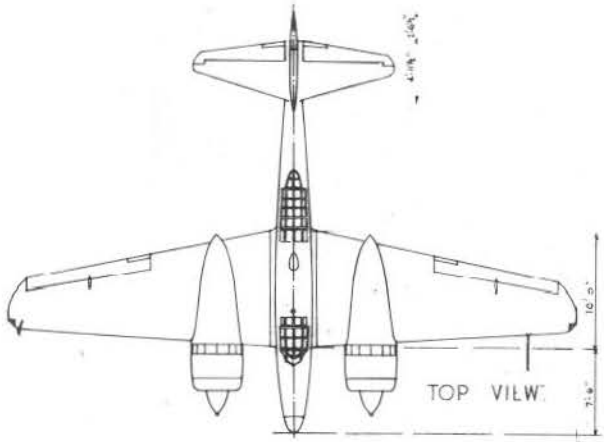
Maximum armament recovered has been 1 x 7.7 mm top rear free gun. One report indicated 2 x 7.7 free guns. Has used grenade discharge device.

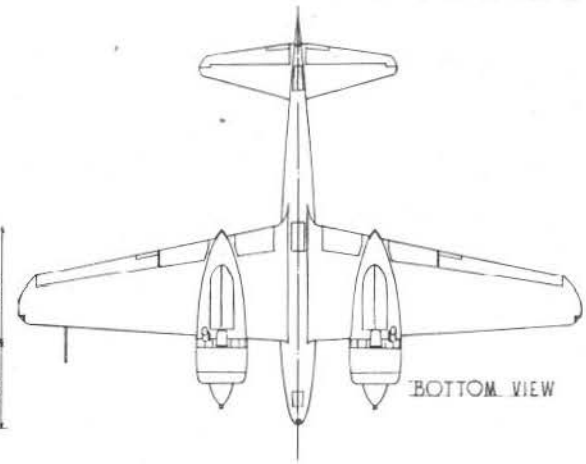
**DATE** December 1944

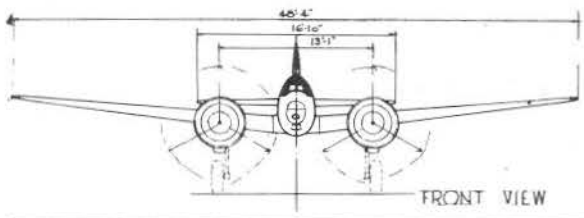
**RESTRICTED**

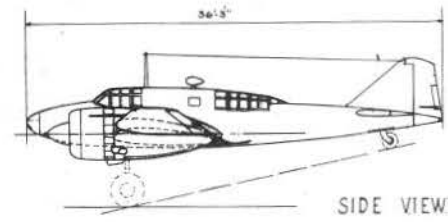
253B-4

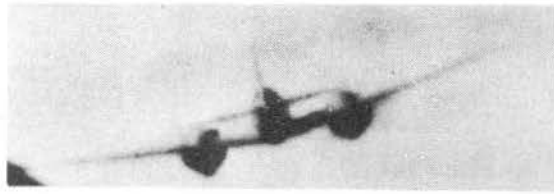
# DINAH 3

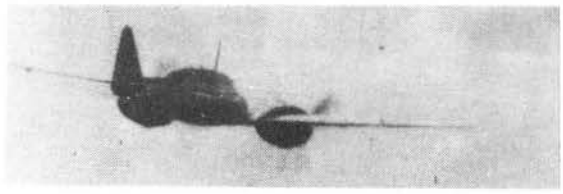


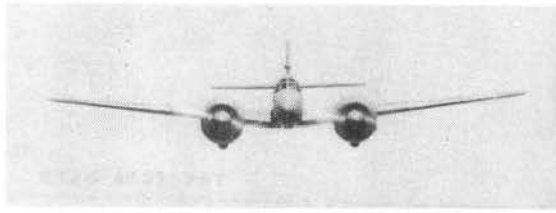



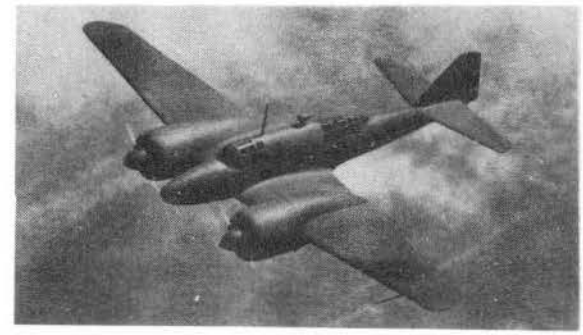



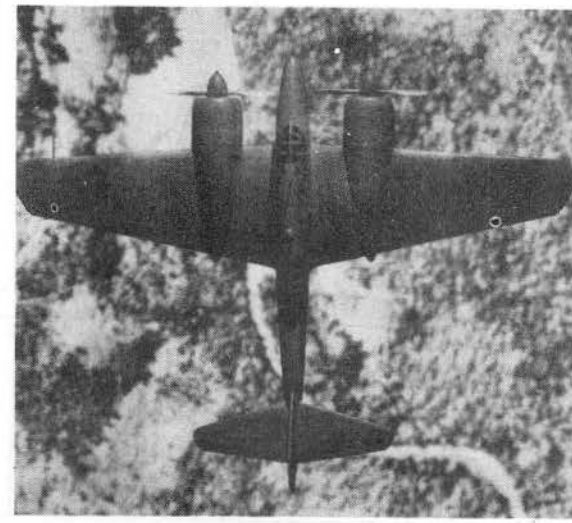











**RESTRICTED**

**DATE** December 1944

254A-1

# CLARA 1

Vulnerability, Fields of Fire, etc.

**ARMAMENT**

| | No. | Size | Rds. Gun | Type | | No. | Size | Rds. Gun | Type |
|---|---|---|---|---|---|---|---|---|---|
| Forward | | | | | Tail | | | | |
| Top | | | | | Wing | | | | |
| Side | | | | | | | | | |
| Bottom | | | | | | | | | |

**TACTICAL DATA**

No information.

**DATE** December 1944

**RESTRICTED**

# PERFORMANCE AND CHARACTERISTICS

# CLARA 1

## TAKE-OFF

| | Load | Feet |
|---|---|---|
| T.O. calm | | |
| T.O. 25 kt. wind | | |
| T.O. over 50' obstacle | | |
| Landing over 50' obstacle | | |

## CLIMB—CEILING

| @ lbs. | Feet | Min. |
|---|---|---|
| Rate @ S.L. | | |
| Rate @ ft. | | |
| Time to | | |
| Time to | | |
| Service ceiling | | |

## AIRCRAFT

Duty Reconnaissance

Designation Ki 70

Description

Mfg. Tachikawa

Engines 2 Crew

Construction All Metal

## SPEED

| @ lbs. | Mph. | Knts. | Altitude |
|---|---|---|---|
| Maximum | | | @ S. L. |
| Maximum | | | @ |
| Cruising | | | |
| Economical | | | |

## BOMBS—CARGO

| | No. | Size | Total Lbs |
|---|---|---|---|
| Normal | | | |
| Maximum | | | |

## ENGINES

| | H. P. | Altitude |
|---|---|---|
| Take-off | | |
| Normal | | |
| Military | | |
| War Emerg. | | |

Mfg.

Model Ha 42

Type

Cylinders Cooling

Supercharger

Propeller Diam.

Fuel - Take-off Cruising

## WEIGHTS

| | Lbs. |
|---|---|
| Empty | |
| Gross | |
| Overload | |

## FUEL

| | U.S. gal. | Imp. gal. |
|---|---|---|
| Built-in | | |
| Internal (Removable) | | |
| External (drop) | | |
| Maximum | | |

## RANGE AND RADIUS

| | Miles | | Speed | | Alt. | Fuel gal. | | Bombs | Cargo |
|---|---|---|---|---|---|---|---|---|---|
| | stat. | naut. | mph. | Knts. | feet | U. S. | Imp. | lbs. | lbs. |
| Maximum range (maximum fuel) | | | | | | | | | |
| Maximum range (normal fuel) | | | | | | | | | |
| Radius ( ) | | | | | | | | | |
| Radius ( ) | | | | | | | | | |

## DIMENSIONS

Span Length

Height Wing area sq.ft.

## GENERAL DATA

CLARA 1 (Ki 70) is a twin-engine reconnaissance plane manufactured by Tachikawa. Powered with two 2000 h.p. 18 cyl. Ha 42 radial engines, CLARA is considered as a possible replacement for DINAH.

255A-1

# EDNA 1

Vulnerability, Fields of Fire, etc.

**ARMAMENT**

| | No. | Size | Rds. Gun | Type | | No. | Size | Rds. Gun | Type |
|---|---|---|---|---|---|---|---|---|---|
| Forward | | | | | Tail | | | | |
| Top | | | | | Wing | | | | |
| Side | | | | | | | | | |
| Bottom | | | | | | | | | |

**TACTICAL DATA**

No information.

**DATE** December 1944

**RESTRICTED**

# PERFORMANCE AND CHARACTERISTICS — EDNA 1

## TAKE-OFF

| | Load | Feet |
|---|---|---|
| T.O. calm | | |
| T.O. 25 kt. wind | | |
| T.O. over 50' obstacle | | |
| Landing over 50' obstacle | | |

## CLIMB—CEILING

| @ lbs. | Feet | Min. |
|---|---|---|
| Rate @ S.L. | | |
| Rate @ ft. | | |
| Time to | | |
| Time to | | |
| Service ceiling | | |

## AIRCRAFT

Duty Reconnaissance

Designation Ki 71

Description

Mfg.

Engines Crew

Construction

## SPEED

| @ lbs. | Mph. | Knts. | Altitude |
|---|---|---|---|
| Maximum | | | @ S. L. |
| Maximum | | | @ |
| Cruising | | | |
| Economical | | | |

## BOMBS—CARGO

| | No. Size | Total Lbs. |
|---|---|---|
| Normal | | |
| Maximum | | |

## ENGINES

| | H. P. | Altitude |
|---|---|---|
| Take-off | | |
| Normal | | |
| Military | | |
| War Emerg. | | |

Mfg.

Model Ha 112

Type

Cylinders Cooling

Supercharger

Propeller Diam.

Fuel - Take-off Cruising

## WEIGHTS

| | Lbs. |
|---|---|
| Empty | |
| Gross | |
| Overload | |

## FUEL

| | U.S. gal. | Imp. gal. |
|---|---|---|
| Built-in | | |
| Internal (Removable) | | |
| External (drop) | | |
| Maximum | | |

## RANGE AND RADIUS

| | Miles | | Speed | | Alt. feet | Fuel gal. | | Bombs lbs. | Cargo lbs. |
|---|---|---|---|---|---|---|---|---|---|
| | stat. | naut. | mph. | Knts. | | U. S. | Imp. | | |
| Maximum range (maximum fuel) | | | | | | | | | |
| Maximum range (normal fuel) | | | | | | | | | |
| Radius ( ) | | | | | | | | | |
| Radius ( ) | | | | | | | | | |

## DIMENSIONS

Span Length

Height Wing area sq.ft.

## GENERAL DATA

EDNA 1 (Ki 71) is a twin-engine reconnaissance plane powered by two 14 cylinder Ha 112 radial engines of 1575 h.p. at takeoff.

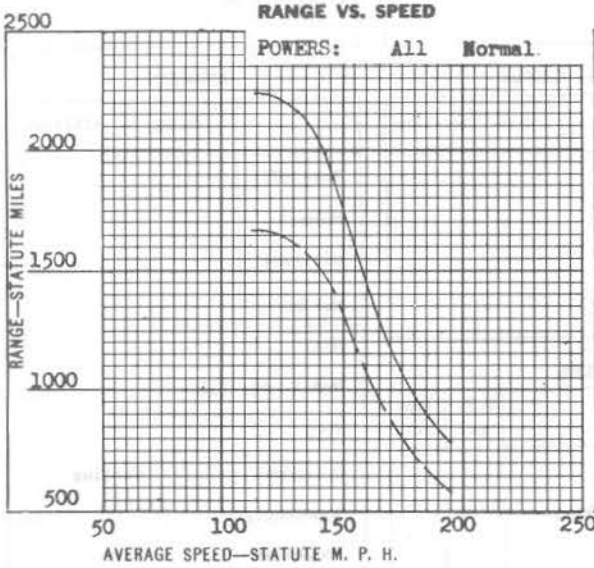
**RESTRICTED** Provisional Data **DATE** December 1944

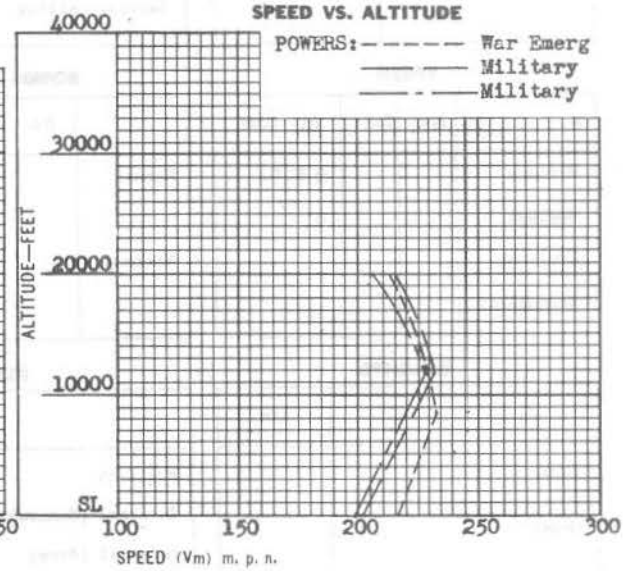
301A-1

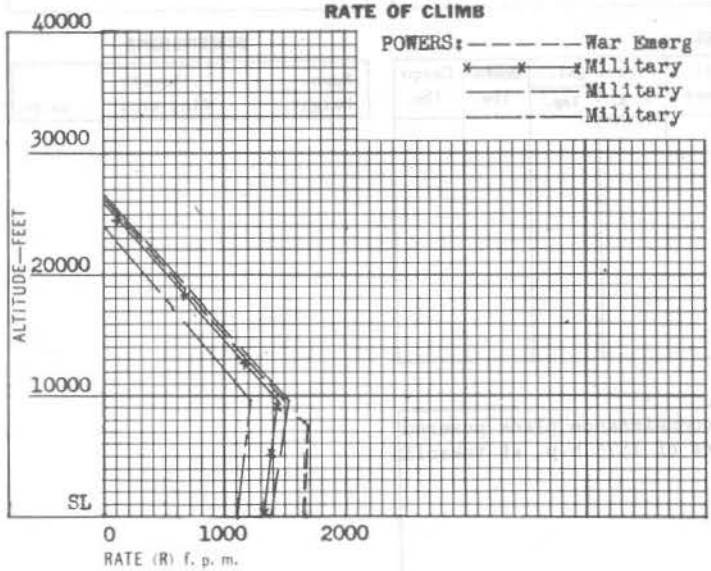
# KATE 12

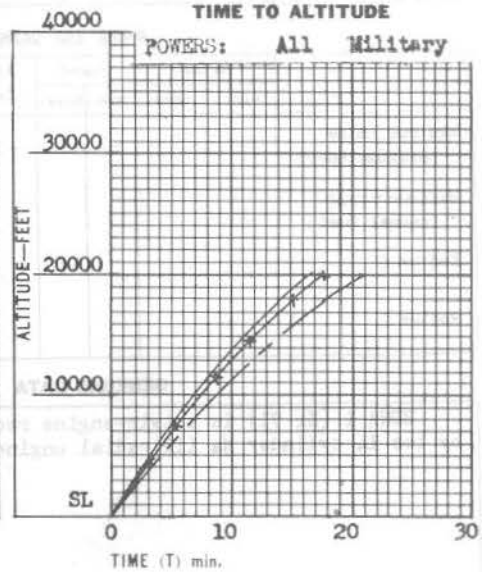
## RANGE * SPEED * CLIMB

| KEY | CONDITION | WEIGHT (lb.) | FUEL LOAD (lb.) | BOMBS—CARGO (lb.) |
|---|---|---|---|---|
| ——— | RECONNAISSANCE | 8834 | 2328 | NONE |
| – – – – – | RECONNAISSANCE | 8834 | 2328 | NONE |
| *—*—*—*—* | SCOUT -- RADAR | 9034 | 2328 | NONE |
| ——— ——— | NORMAL BOMBER | 8731 | 1740 | 550 |
| ——— – – ——— | NORMAL TORPEDO | 9946 | 1740 | 1765 |




**DATE** December 1944

**RESTRICTED**

# PERFORMANCE AND CHARACTERISTICS

# KATE 12

## TAKE-OFF

| | Load | Feet |
|---|---|---|
| T.O. calm | 9946 | 789 |
| T.O. 25 kt. wind | 9946 | 286 |
| T.O. over 50' obstacle | | |
| Landing over 50' obstacle | | |

## CLIMB—CEILING

| @ 9946 lbs. | Feet | Min. |
|---|---|---|
| Rate @ S.L. | 1105 | 1 |
| Rate @ 9850 ft. | 1205 | 1 |
| Time to 10,000' | | 8.7 |
| Time to 30,000' | | 21.8 |
| Service ceiling 24,000' | | |

## AIRCRAFT

Duty **Torpedo Bomber**

Designation **Type 97, Model 12**

Description **Low-wing Monoplane**

Mfg. **Nakajima**

Engines **1** Crew **2 or 3**

Construction **All Metal**

## SPEED

| @ 9946 lbs. | Mph. | Knts. | Altitude |
|---|---|---|---|
| War Emerg. | 216 | 187 | @ S.L. |
| Maximum | 199 | 172 | @ S.L. |
| War Emerg. | 233 | 202 | @ 8,500' |
| Maximum | 228 | 197 | @ 10,850' |
| Cruising 75% | 144 | 124 | 1,500' |
| Economical | | | |

## BOMBS—CARGO

| | No. | Size | Total Lbs. |
|---|---|---|---|
| Normal | 1 | 800 kg (torp) | 1760 |
| or | 1 | 250 kg (bomb) | 550 |
| Maximum | | | |

## ENGINES

| | H. P. | Altitude |
|---|---|---|
| Take-off | 985 | S.L. |
| Normal | | |
| Military | 870<br>955 | S.L.<br>9,850' |
| War Emerg. | 1030 | 7,500' |

Mfg. **Nakajima**

Model **Sakae 11**

Type **Radial**

Cylinders **14** Cooling **Air**

Supercharger **Single Speed**

Propeller **3 Blade** Diam. **10.5'** **C.S.**

Fuel - Take-off **92** Cruising **92**

## WEIGHTS

| | Lbs. |
|---|---|
| Empty | 5439 |
| Gross (Bomber) | 8731 |
| Overload (Torpedo) | 9946 |

## FUEL

| | U.S. gal. | Imp. gal. |
|---|---|---|
| Built-in | 290 | 241 |
| Internal (Removable) | | |
| External (drop) | 98 | 81 |
| Maximum | 388 | 322 |

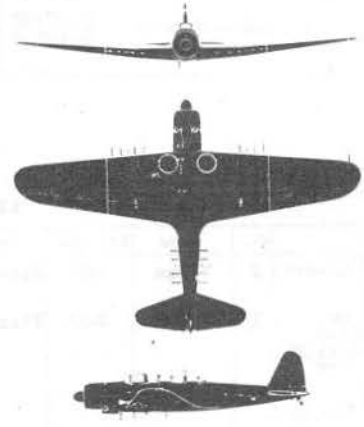
## * RANGE AND RADIUS

| | Miles | | Speed | | Alt. | Fuel gal. | | Bombs | Cargo |
|---|---|---|---|---|---|---|---|---|---|
| | stat. | naut. | mph. | Knts. | feet | U. S. | Imp. | lbs. | lbs. |
| Maximum range Reconnaissance | 2240 | 1945 | 114 | 99 | 1500 | 388 | 322 | None | None |
| At 75% Vmax. | 1875 | 1628 | 146 | 127 | 1500 | 388 | 322 | None | None |
| Maximum range Torpedo | 1665 | 1446 | 113 | 97 | 1500 | 290 | 241 | 1760 | None |
| At 75% Vmax. | 1400 | 1216 | 146 | 127 | 1500 | 290 | 241 | 1760 | None |
| Radius ( ) | | | | | | | | | |
| Radius ( ) | | | | | | | | | |

## DIMENSIONS

Span **50.9'** Length **34.2'**

Height **13.5'** Wing area **415** sq.ft.



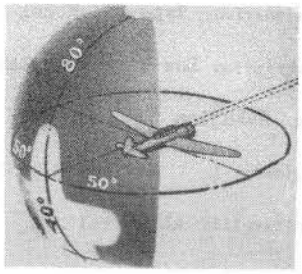
## GENERAL DATA

**KATE is rapidly becoming obsolete, being replaced by faster carrier aircraft such as MYRT and JILL.**

*** Maximum Range (Reconnaissance) figures are given for a scout condition of 8834 lbs. gross weight. Maximum Range (Torpedo) data is given with the plane in an overload condition**

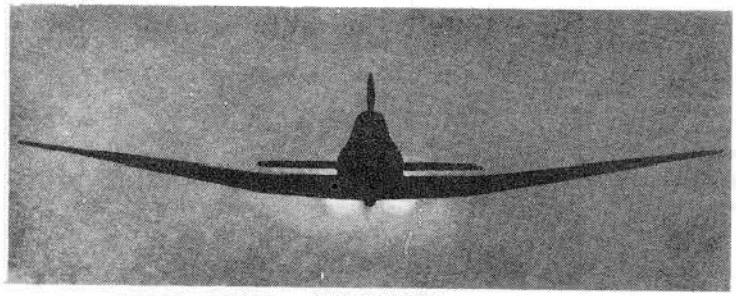
# KATE 12

## FIELDS OF FIRE



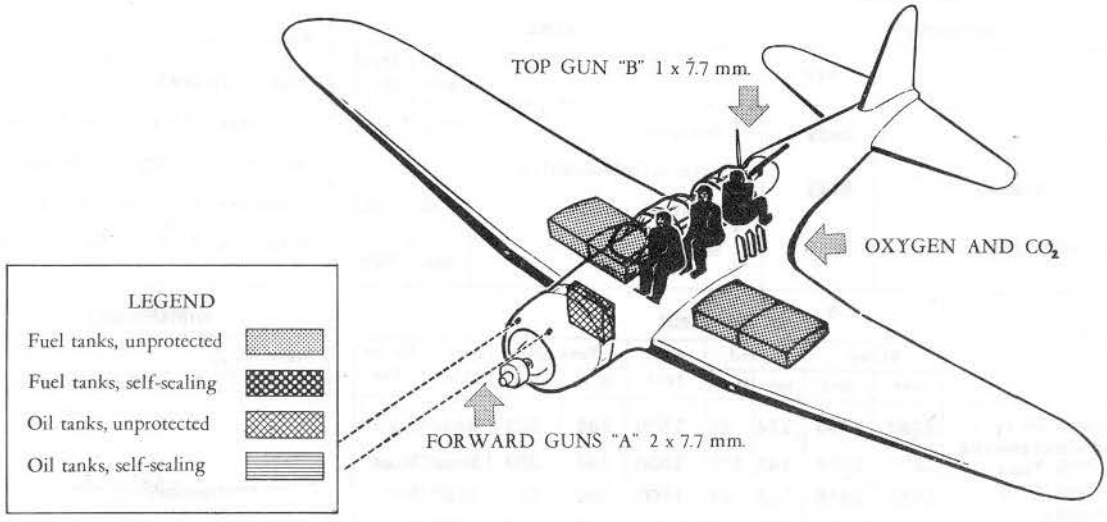

TOP GUN "B" AND
FORWARD GUNS "A"
¾-rear view from above

## EXHAUST FLAME PATTERNS



REAR VIEW

## VULNERABILITY




## ARMAMENT

| | No. | Size | Rds. Gun | Type | | No. | Size | Rds. Gun | Type |
|---|---|---|---|---|---|---|---|---|---|
| Forward | 2 | 7.7mm | 600 | Fixed | Tail | | | | |
| Top Rear Cockpit Side | 1 | 7.7mm | 300 | Flex. | Wing | | | | |
| Bottom | | | | | | | | | |

## TACTICAL DATA

KATE is vulnerable to attack because of its low speed and unprotected crew and fuel tanks.

Radar is carried.

**DATE** December 1944

**RESTRICTED**

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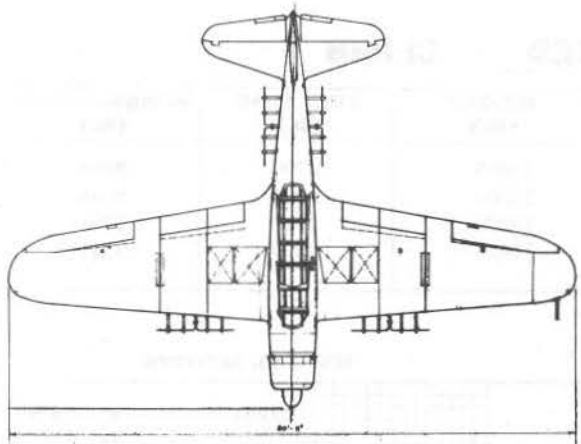
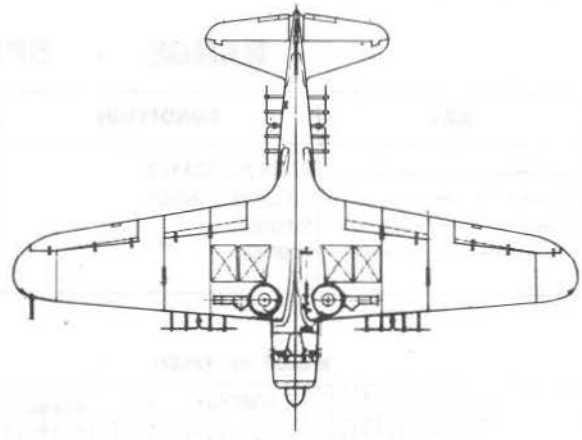
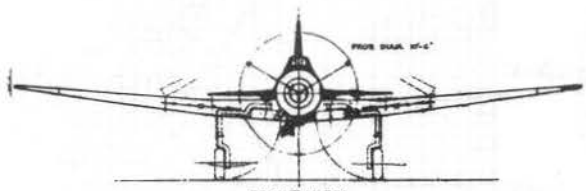
# KATE 12



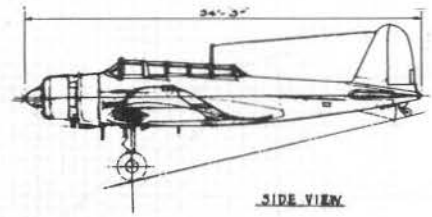
TOP VIEW



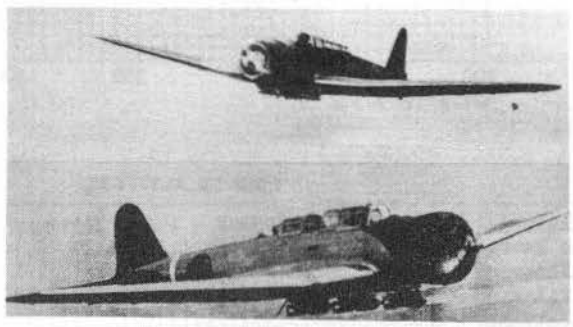
BOTTOM VIEW

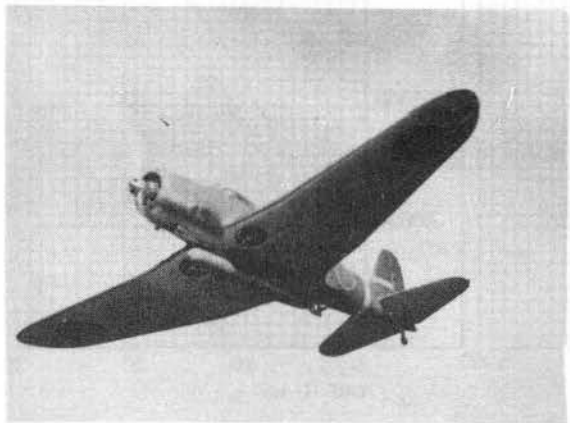


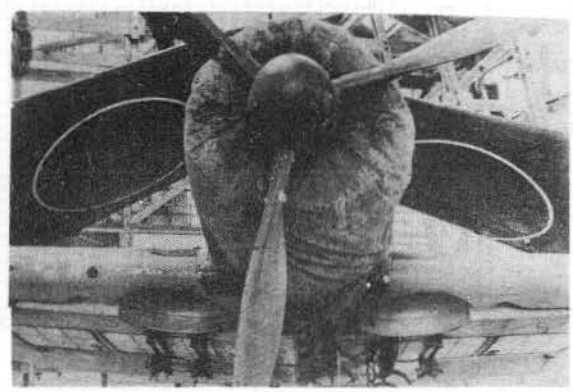
FRONT VIEW



SIDE VIEW







**RESTRICTED**

**DATE** December 1944

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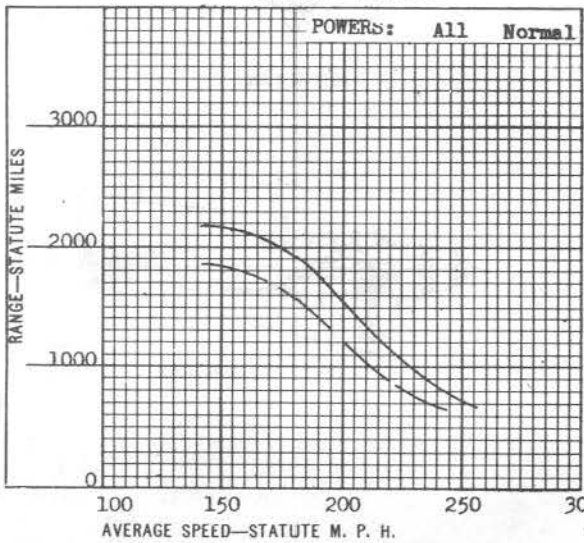
# JILL 12

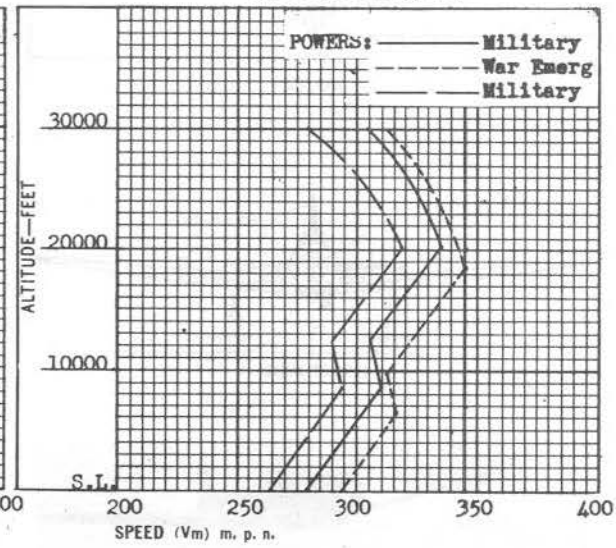
## RANGE * SPEED * CLIMB

| KEY | CONDITION | WEIGHT (lb.) | FUEL LOAD (lb.) | BOMBS—CARGO (lb.) |
|---|---|---|---|---|
| ——————— | RECONNAISSANCE | 10205 | 2700 | None |
| — — — — — — — — — | RECONNAISSANCE | 10205 | 2700 | None |
| —— —— —— | TORPEDO | 12070 | 2700 | 1765 |
| —— — — —— — — | BOMBER | 11625 | 2700 | 1325 |

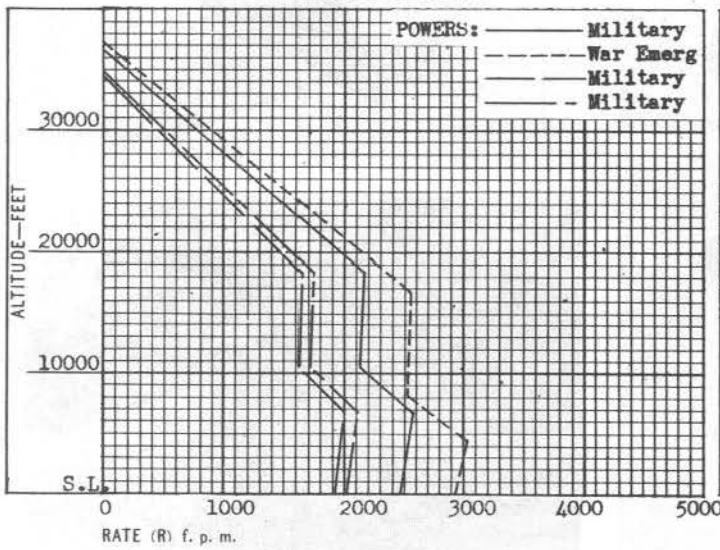
**RANGE VS. SPEED**



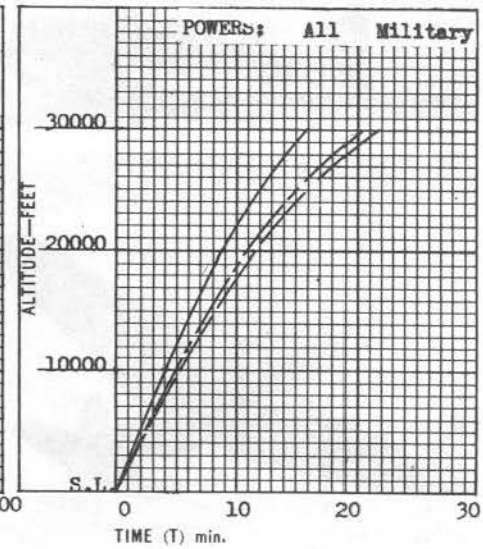

**SPEED VS. ALTITUDE**




**RATE OF CLIMB**




**TIME TO ALTITUDE**




**DATE** December 1944

**RESTRICTED**

# PERFORMANCE AND CHARACTERISTICS

# JILL 12

### TAKE-OFF

| | Load | Feet |
|---|---|---|
| T.O. calm | 12070 | 705 |
| T.O. 25 kt. wind | 12070 | 294 |
| T.O. over 50' obstacle | | |
| Landing over 50' obstacle | | |

### CLIMB—CEILING

| @ 12070 lbs. | Feet | Min. |
|---|---|---|
| Rate @ S.L. | 1920 | 1 |
| Rate @ 6900 ft. | 2000 | 1 |
| Time to 10,000' | | 5.2 |
| Time to 20,000' | | 11.4 |
| Service ceiling 33,400' | | |

### AIRCRAFT

Duty Torpedo Bomber

Designation (TENZAN) Model 12

Description Low -wing Monoplane

Mfg. Nakajima

Engines 1 Crew 3

Construction All Metal

### SPEED

| @ 12070 lbs. | Mph. | Knts. | Altitude |
|---|---|---|---|
| Maximum | 264 | 230 | @ S. L. |
| Maximum (Recco. cond) | 318 | 276 | @ 19,500' |
| Cruising 75% | 345 | 300 | @ 18,600' |
| Economical | 183 | 159 | 1,500' |

### BOMBS—CARGO

| | No. | Size | Total Lbs. |
|---|---|---|---|
| Normal | 6 | 100 kg | 1320 |
| or | 1 | 800 kg (Torp.) | 1760 |
| Maximum | | 800 kg | 1760 |

### ENGINES

| | H. P. | Altitude |
|---|---|---|
| Take-off | 1825 | S.L. |
| Normal | 1245 | S.L. |
| Military | 1655 | 6,900' |
| | 1520 | 18,300' |
| War Emerg. | 1880 | 4,400' |

Mfg. Mitsubishi

Model Kasei 25 Water Injection

Type Radial

Cylinders 14 Cooling Air

Supercharger 2 Speed

Propeller 4 Blade Diam. 11.2' C.S.

Fuel - Take-off 92 Cruising 92 plus methanol

### WEIGHTS

| | | Lbs. |
|---|---|---|
| Empty | | 6300 |
| Gross | Recco | 10205 |
| | Bomber | 11625 |
| | Torpedo | 12070 |

### FUEL

| | U.S. gal. | Imp. gal. |
|---|---|---|
| Built-in | 450 | 374 |
| Internal (Removable) | | |
| External (drop) | | |
| Maximum | 450 | 374 |

### * RANGE AND RADIUS

| | Miles | | Speed | | Alt. feet | Fuel gal. | | Bombs lbs. | Cargo lbs. |
|---|---|---|---|---|---|---|---|---|---|
| | stat. | naut. | mph. | Knts. | | U. S. | Imp. | | |
| Maximum range Torpedo | 1850 | 1606 | 142 | 123 | 1500 | 450 | 374 | 1760 | None |
| @ 75% Vmax. | 1565 | 1349 | 183 | 159 | 1500 | 450 | 374 | 1760 | None |
| Maximum range Reconnaissance | 2175 | 1889 | 141 | 123 | 1500 | 450 | 374 | None | None |
| @ 75% Vmax. | 1725 | 1498 | 192 | 167 | 1500 | 450 | 374 | None | None |
| Radius ( ) | | | | | | | | | |
| Radius ( ) | | | | | | | | | |

### DIMENSIONS

Span 49.0' Length 36.1'

Height Wing area 395 sq.ft.

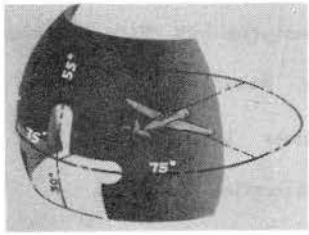
### GENERAL DATA

JILL is a torpedo bomber designed to replace KATE. JILL 11 is similar to JILL 12 except that JILL 11 uses the MAMORU 12 engine. The performance of the two models is essentially the same except for a higher critical altitude on JILL 12.

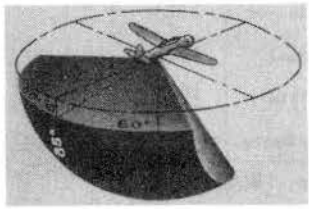
*All performance except range is for torpedo loading. Max. Range (torpedo) is based on torpedo loading while Maximum Range (reconnaissance) is computed in a reconnaissance condition with maximum fuel.

# JILL 12

## FIELDS OF FIRE

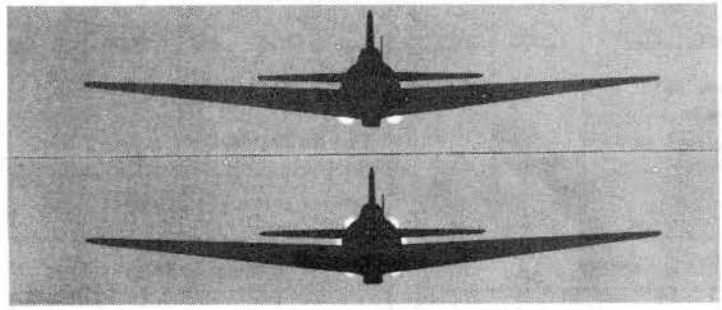



TOP GUN "A"
¾-rear view from above
Provisional field of fire



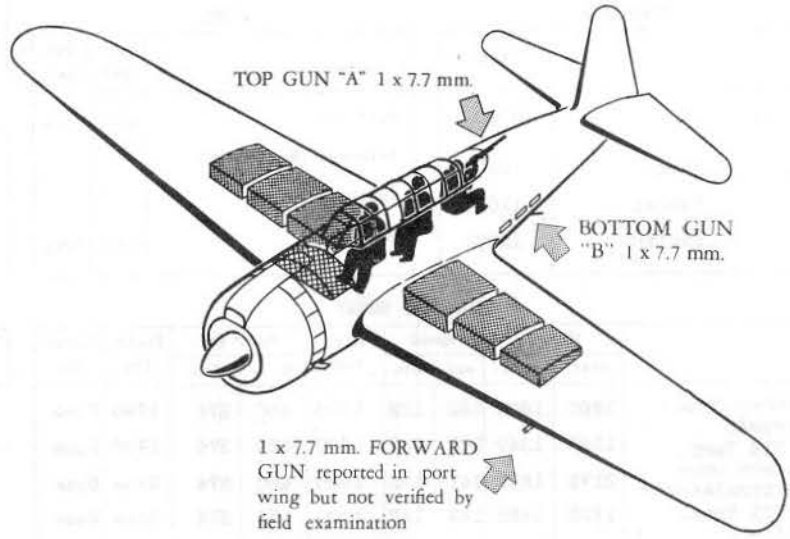

BOTTOM GUN "B"
¾-rear view from above

## EXHAUST FLAME PATTERNS



REAR VIEW
Flame Patterns vary

## VULNERABILITY




LEGEND
Fuel tanks, unprotected
Fuel tanks, self-sealing
Oil tanks, unprotected
Oil tanks, self-sealing

Location of oxygen cylinders unknown

### ARMAMENT

| | No. | Size | Rds. Gun | Type | | No. | Size | Rds. Gun | Type |
|---|---|---|---|---|---|---|---|---|---|
| Forward Left Wing | 1 | 7.7 mm | 400 | Fixed | Tail | | | | |
| Top Rear Cockpit | 1 | 7.7 mm | 700 | Flex. | Wing | | | | |
| Bottom | 1 | 7.7 mm | 700 | Flex. | | | | | |

### TACTICAL DATA

Ineffective fuel tank protection and light armament, together with no evidence of armor indicates that JILL has no decided advantage over KATE except in speed and climb.

There is evidence of radar being installed on JILL.

**DATE** December 1944

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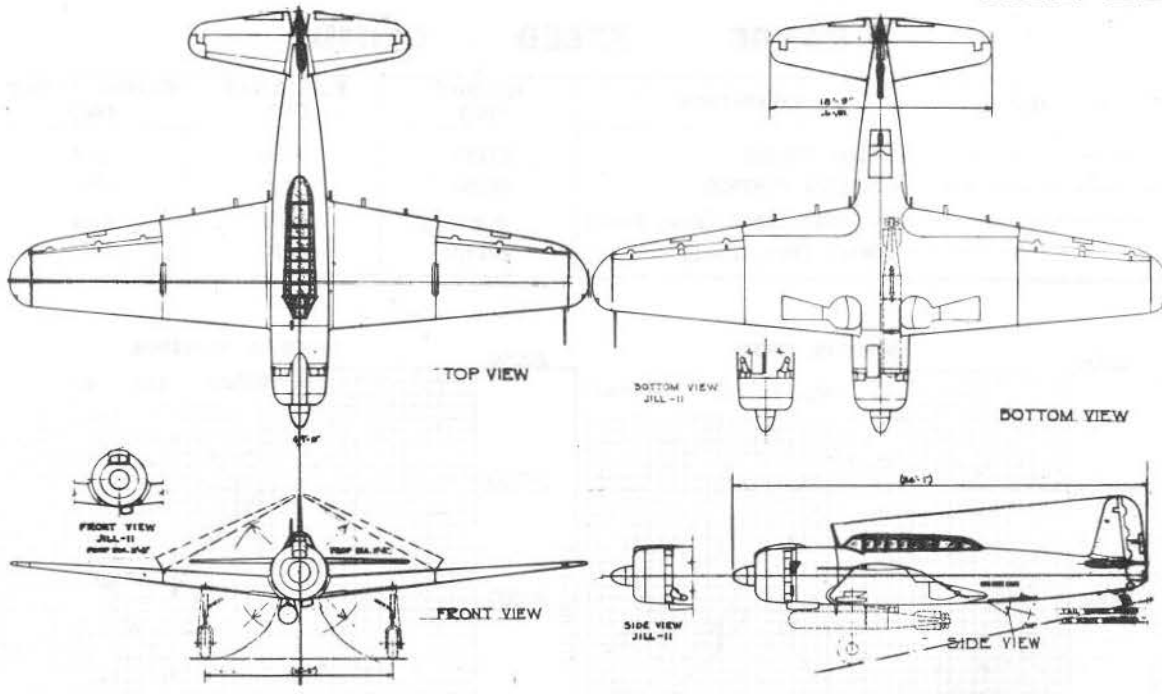
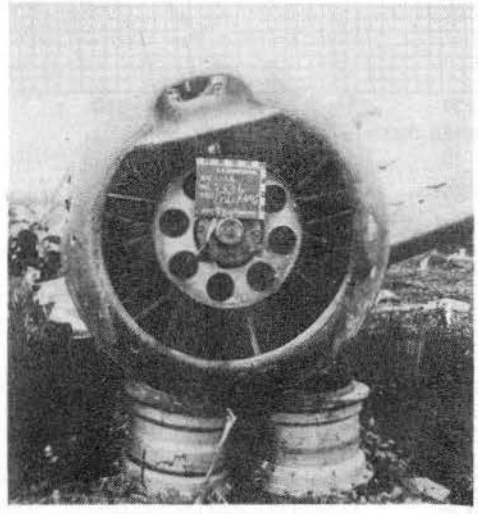
# JILL 12



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DATE December 1944

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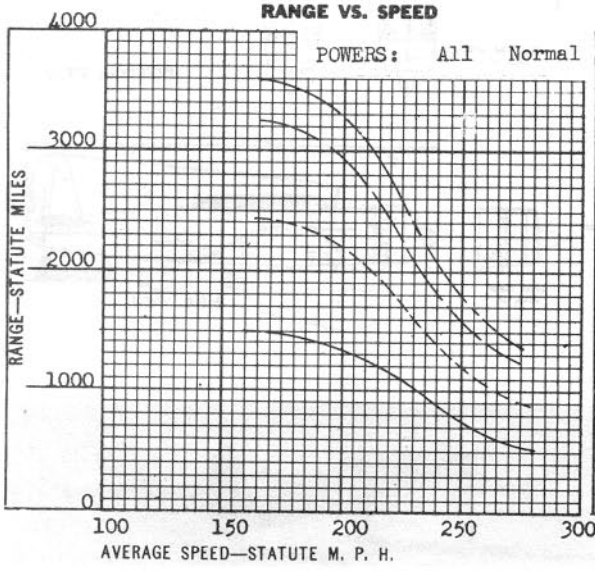
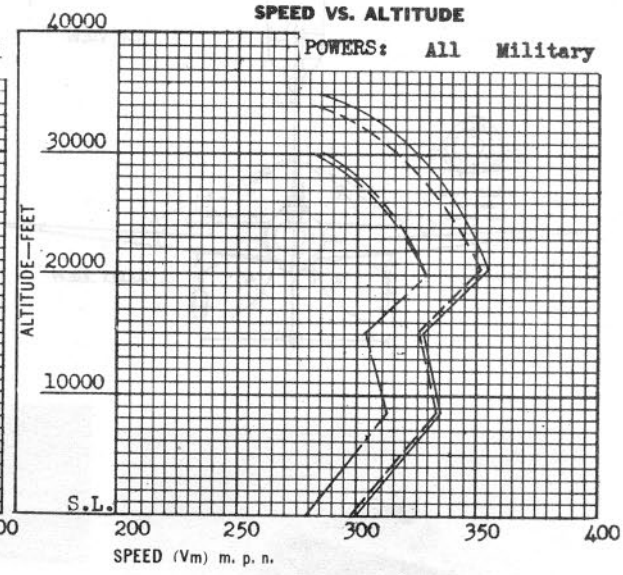
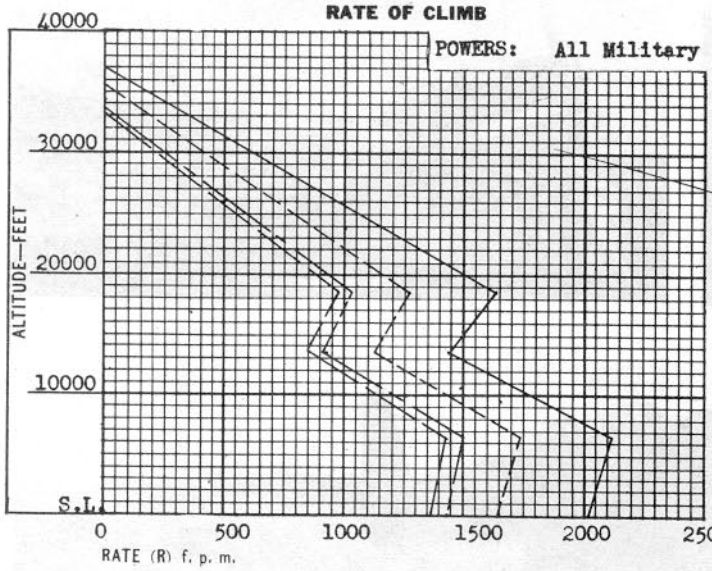
# FRANCES 11

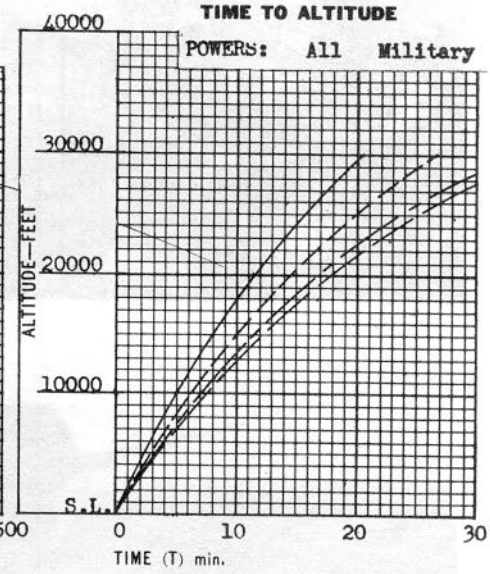
## RANGE * SPEED * CLIMB

| KEY | CONDITION | WEIGHT (lb.) | FUEL LOAD (lb.) | BOMBS—CARGO (lb.) |
|---|---|---|---|---|
| ——— | NORMAL BOMBER | 23150 | 3530 | 1100 |
| – – – – – – | OVERLOAD TORPEDO | 26460 | 5840 | 1765 |
| ——— – ——— | RECONNAISSANCE (Max. Fuel) | 28450 | 9400 | None |
| ——— ——— ——— | BOMBER (Max. Fuel) | 29180 | 8420 | 1765 |




**DATE** December 1944

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# PERFORMANCE AND CHARACTERISTICS

# FRANCES 11

## TAKE-OFF

| | Load | Feet |
|---|---|---|
| T.O. calm | 23,150<br>29,180 | 1018<br>1480 |
| T.O. 25 kt. wind | 23,150<br>29,180 | 476<br>700 |
| T.O. over 50' obstacle | | |
| Landing over 50' obstacle | | |

## CLIMB—CEILING

| @ 23,150 lbs. | Feet | Min. |
|---|---|---|
| Rate @ S.L. | 2015 | 1 |
| Rate @ 18,600 ft. | 1630 | 1 |
| Time to 10,000 | | 5.0 |
| Time to 20,000 | | 11.3 |
| Service ceiling 35,900' | | |

## AIRCRAFT

Duty Medium & Torpedo Bomber

Designation GINKA, Model 11

Description Mid-Wing Monoplane

Mfg. Nakajima

Engines 2 Crew 3

Construction All Metal

## SPEED

| @ 23150 lbs. | Mph. | Knts. | Altitude |
|---|---|---|---|
| Maximum | 300 | 261 | @ S. L. |
| Maximum | 355 | 308 | @ 20,600' |
| Cruising @ 75% | 210 | 183 | 1,500' |
| Economical | | | |

## BOMBS—CARGO

| | No. | Size | Total Lbs. |
|---|---|---|---|
| Normal | 1 | 800 kg | 1771 |
| or | 1 | 800 kg Torp. | 1870 |
| Maximum | 2 | 500 kg | 2231 |

## ENGINES

| | H. P. | Altitude |
|---|---|---|
| Take-off | 1795 | S.L. |
| Normal | 1295<br>1130 | 9,500'<br>19,800' |
| Military | 1625<br>1420 | 6,560'<br>18,700' |
| War Emerg. | 1840 | 3,020' |

Mfg. Nakajima

Model Homare 11

Type Radial

Cylinders 18 Cooling Air

Supercharger 2 Speed

Propeller 3 Blade Diam. 11.5' C.S.

Fuel - Take-off 92 Cruising 92 plus methanol

## WEIGHTS

| | Lbs. |
|---|---|
| Empty | 14,665 |
| Gross | 23,150 |
| Overload | 29,180 |

## FUEL

| | U.S. gal. | Imp. gal. |
|---|---|---|
| Built-in | 998 | 830 |
| Internal (Removable) | 276 | 229 |
| External (drop) | 292 | 242 |
| Maximum | 1566 | 1301 |

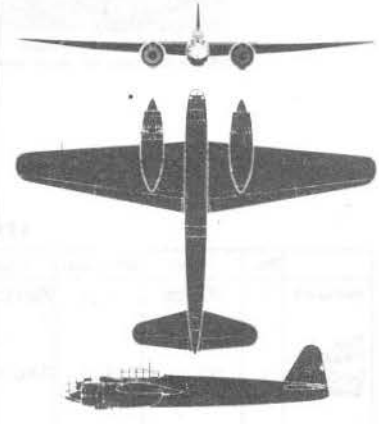
## RANGE AND RADIUS

| | Miles | | Speed | | Alt. | Fuel gal. | | Bombs | Cargo |
|---|---|---|---|---|---|---|---|---|---|
| | stat. | naut. | mph. | Knts. | feet | U. S. | Imp. | lbs. | lbs. |
| Maximum range (maximum fuel) | 3600 | 3126 | 165 | 143 | 1500 | 1566 | 1301 | None | None |
| At 75% Vmax. | 3150 | 2735 | 207 | 180 | 1500 | 1566 | 1301 | None | None |
| Maximum range (normal fuel) | 2425 | 2106 | 164 | 142 | 1500 | 998 | 830 | 1765 | None |
| At 75% Vmax. | 2075 | 1802 | 209 | 181 | 1500 | 998 | 830 | 1765 | None |
| Radius ( ) | | | | | | | | | |
| Radius ( ) | | | | | | | | | |

## DIMENSIONS

Span 65.6' Length 49.2'

Height 17.4' Wing area 592 sq.ft.

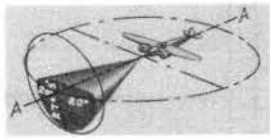


## GENERAL DATA

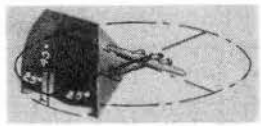
FRANCES is expected to be used primarily as a torpedo bomber and secondarily for level and dive bombing. A night fighter version with KASEI 25 engines is expected to have increased fire power. Use of radar in the night fighter version is considered probable. (See sheet 303B)

# FRANCES 11 (Torpedo bomber version)

## FIELDS OF FIRE

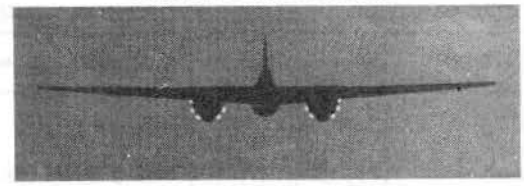


FORWARD GUN "A" 1 x 20 mm.
¾-front view from above
Turret can be rotated mechanically thru 360° about axis "A"-"A"



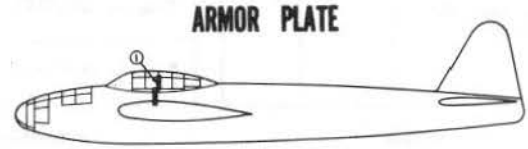
TOP GUN "B" 1 x 20 mm.
¾-rear view from above

## EXHAUST FLAME PATTERNS



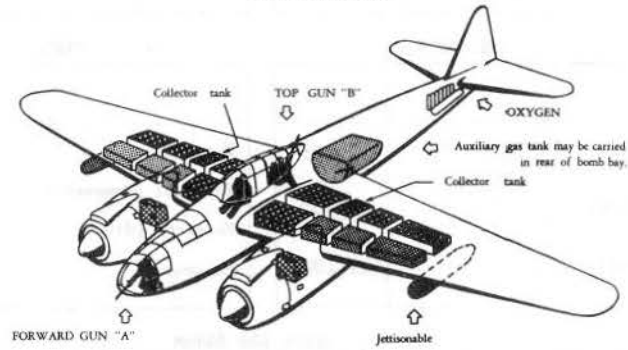
REAR VIEW

## ARMOR PLATE



10 mm.
1
Viewed from rear

## VULNERABILITY

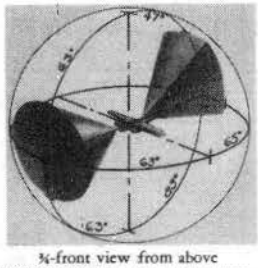



Two Jettisonable gas tanks may be carried in bomb bay in place of bomb load.

LEGEND

| | | | |
|---|---|---|---|
| Fuel tanks, protected | | Oil tanks, protected | |
| Fuel tanks, unprotected | | Oil tanks, unprotected | |

## FIRE FREE FIELDS



¾-front view from above
FORWARD GUN shows full rotation coverage.

## ARMAMENT

| | No. | Size | Rds. Gun | Type | | No. | Size | Rds. Gun | Type |
|---|---|---|---|---|---|---|---|---|---|
| Forward | 1 | 20 mm | 135 | Flexible | Tail | | | | |
| Top Rear | | | | | Wing | | | | |
| Cockpit Side | 1 | 20 mm | 225 | Flexible | | | | | |
| Bottom | | | | | | | | | |

## TACTICAL DATA

Of the eight fixed fuel tanks in each wing, four are leak proofed. The three additional fuselage tanks and the two underwing tanks are of conventional construction (non-leak proof).

Armor plate is provided for the pilot's seat and head. There are indications that some armor protection is provided the fuel tanks.

**DATE** December 1944

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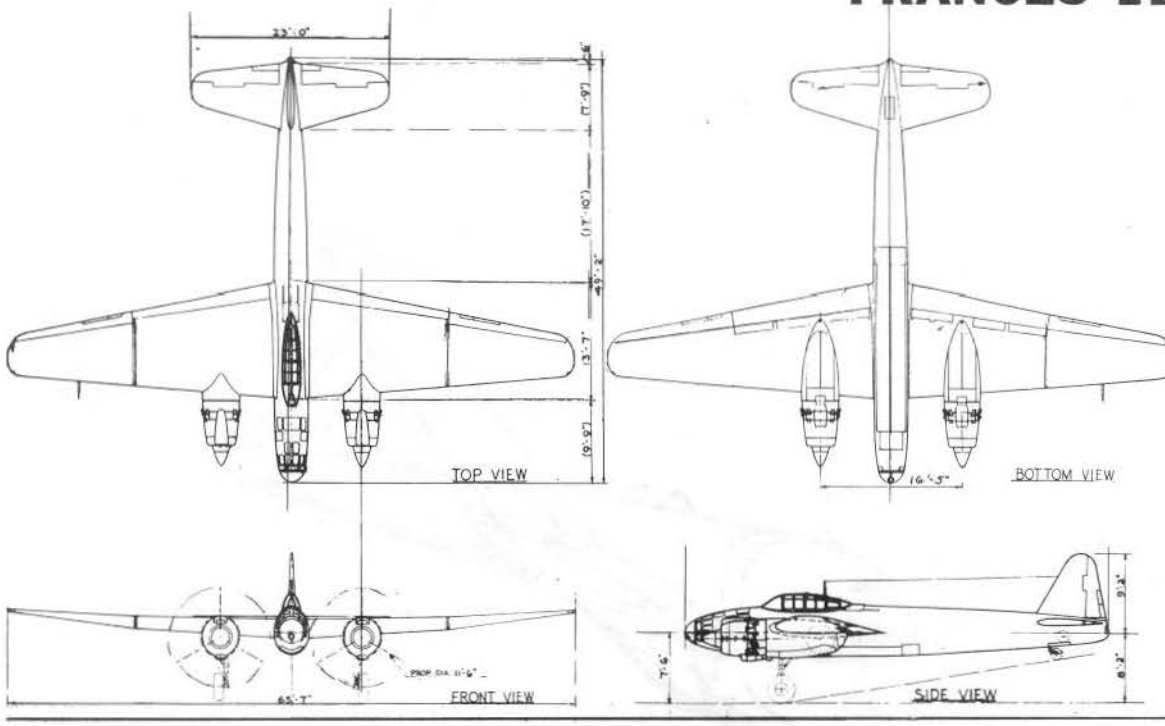
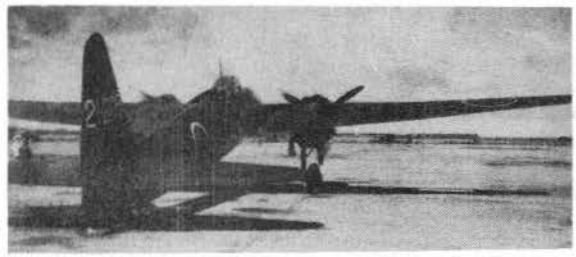
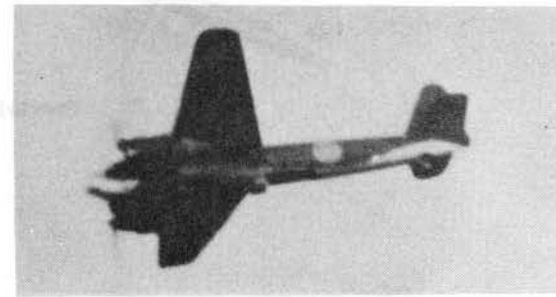
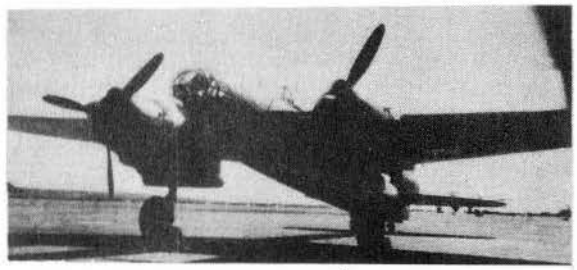
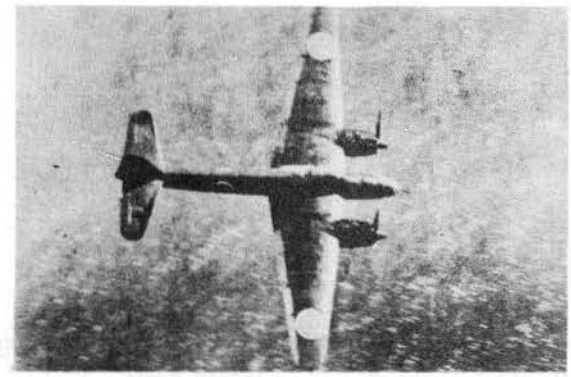
# FRANCES 11

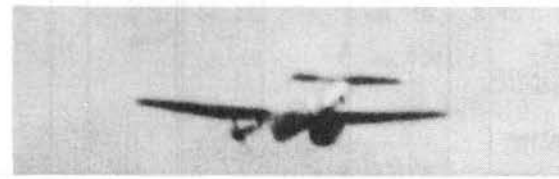










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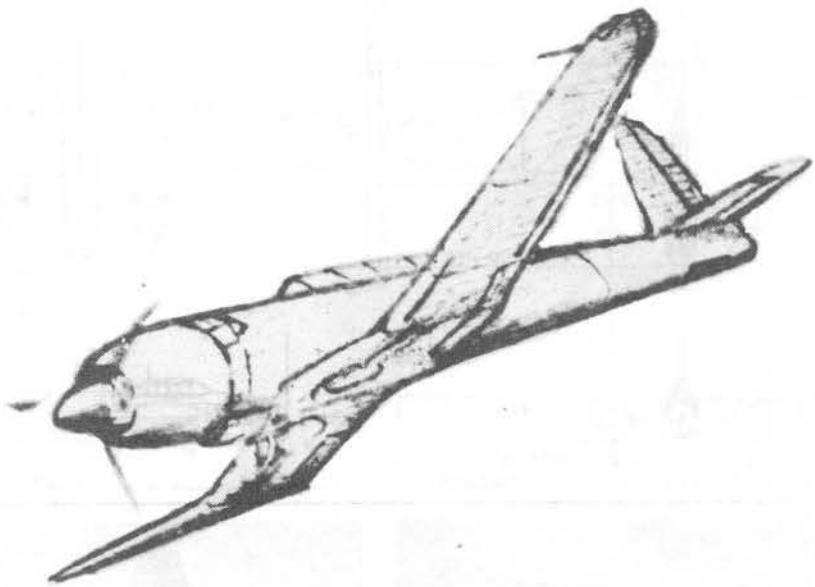
# GRACE 11



Provisional Sketch

**ARMAMENT**

| | No. | Size | Rds. Gun | Type | | No. | Size | Rds. Gun | Type |
|---|---|---|---|---|---|---|---|---|---|
| Forward | 2 | 7.7 mm | | Fixed | Tail | | | | |
| or | 2 | 20 mm | | Fixed | | | | | |
| Top Rear Cockpit | 1 | 7.7 mm | | Flex. | Wing | | | | |
| Side | | | | | | | | | |
| Bottom | | | | | | | | | |

**TACTICAL DATA**

Contradictory evidence points to the use of 20 mm and/or 7.7 mm installations. The types most likely to be used are the ones listed here.

**DATE** December 1944

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# PERFORMANCE AND CHARACTERISTICS — GRACE 11

## TAKE-OFF

| | Load | Feet |
|---|---|---|
| T.O. calm | | |
| T.O. 25 kt. wind | | |
| T.O. over 50' obstacle | | |
| Landing over 50' obstacle | | |

## CLIMB—CEILING

| @ lbs. | Feet | Min. |
|---|---|---|
| Rate @ S.L. | | |
| Rate @ ft. | | |
| Time to 13,125 | | 7.5 |
| Time to | | |
| Service ceiling | | |

## AIRCRAFT

Duty: Carrier Borne Attack

Designation: (RYUSEI) Model 11

Description: Low-wing Monoplane Inverted Gull Wing

Mfg. Aichi

Engines 1 Crew 2

Construction: All metal

## SPEED

| @ lbs. | Mph. | Knts. | Altitude |
|---|---|---|---|
| Maximum | | | @ S. L. |
| Maximum | 350 | 304 | @ 19,686' |
| Cruising | 230 | 200 | 13,125' |
| Economical | | | |

## BOMBS—CARGO

| | No. | Size | Total Lbs. |
|---|---|---|---|
| Normal | 1 | 1765 lb (Torp.) | |
| or | 1 | 1100 lb | |
| or | 2 | 550 lb | |
| or | 6 | 132 lb | |
| | | | 1765 |

## ENGINES

| | H. P. | Altitude |
|---|---|---|
| Take-off | 1795 | S.L. |
| Normal | 1625 | 6,560' |
| Military | 1420 | 18,700' |
| War Emerg. | 1840 | 3,000' |

Mfg. Nakajima

Model Homare 11

Type Radial

Cylinders 18 Cooling Air

Supercharger 2 Speed

Propeller 4 Blade Diam. C.S.

Fuel - Take-off 92 Cruising 92 plus methanol

## WEIGHTS

| | Lbs. |
|---|---|
| Empty | 6817 |
| Gross | 10782 |
| Overload | 11808 |

## FUEL

| | U.S. gal. | Imp. gal. |
|---|---|---|
| Built-in | 384 | 320 |
| Internal (Removable) | | |
| External (drop) | | |
| Maximum | | |

## RANGE AND RADIUS

| | Miles stat. | Miles naut. | Speed mph. | Speed Knts. | Alt. feet | Fuel gal. U. S. | Fuel gal. Imp. | Bombs lbs. | Cargo lbs. |
|---|---|---|---|---|---|---|---|---|---|
| Maximum range (maximum fuel) | 2070 | 1800 | | | | 384 | 320 | | |
| Maximum range (normal fuel) | 1240 | 1080 | | | | | | | |
| Radius ( ) | | | | | | | | | |
| Radius ( ) | | | | | | | | | |

## DIMENSIONS

Span 47.3' Length 37.5'

Height Wing area sq.ft.

## GENERAL DATA

GRACE is designed to succeed or to supplement KATE and the newer JILL.

Designed as a torpedo bomber, it may also have a dive bomber version.



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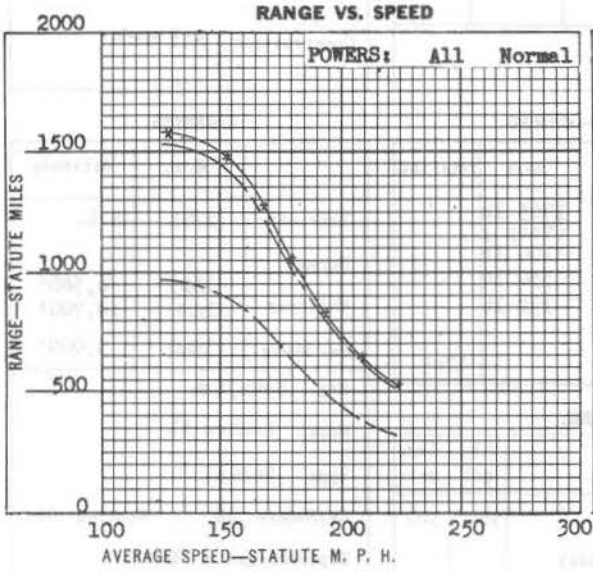
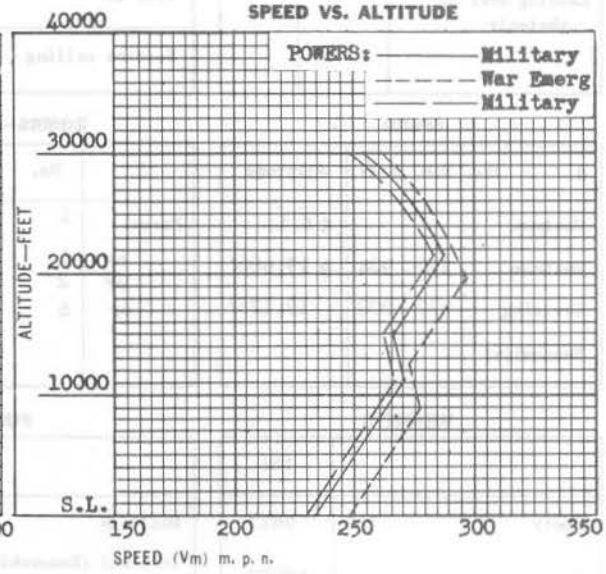
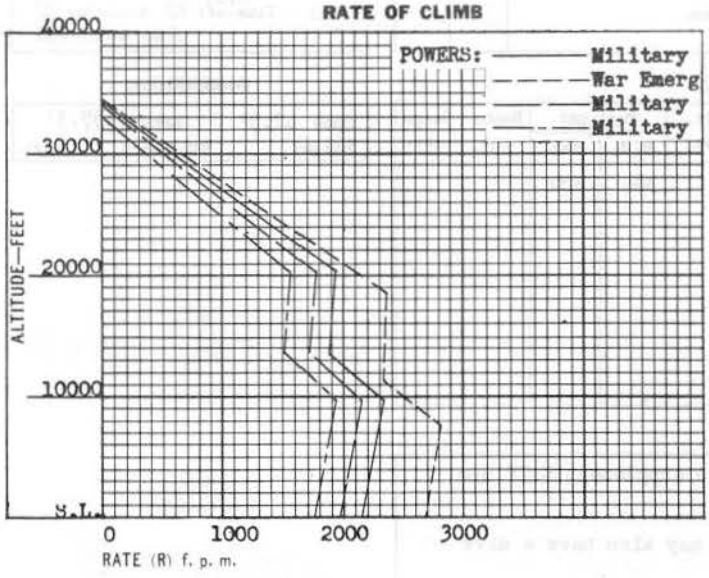
# VAL 22

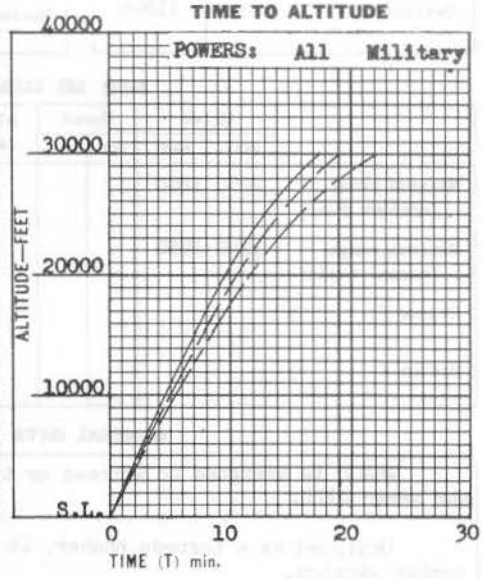
## RANGE * SPEED * CLIMB

| KEY | CONDITION | WEIGHT (lb.) | FUEL LOAD (lb.) | BOMBS—CARGO (lb.) |
|---|---|---|---|---|
| ——— | RECONNAISSANCE | 7830 | 1050 | None |
| - - - - | RECONNAISSANCE | 7830 | 1050 | None |
| -x-x-x-x-x- | RECONNAISSANCE (Max. Fuel) | 8492 | 1712 | None |
| —— —— —— | NORMAL BOMBER | 8380 | 1050 | 550 |
| ——— - - ——— | BOMBER (Max. Fuel) | 9042 | 1712 | 550 |




**DATE** December 1944

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# PERFORMANCE AND CHARACTERISTICS

# VAL 22

### TAKE-OFF

| | Load | Feet |
|---|---|---|
| T.O. calm | 7830 | 516 |
| T.O. 25 kt. wind | 7830 | 188 |
| T.O. over 50' obstacle | | |
| Landing over 50' obstacle | | |

### CLIMB—CEILING

| @ 7830 lbs. | Feet | Min. |
|---|---|---|
| Rate @ S.L. | 2160 | 1 |
| Rate @ 9850 ft. | 2330 | 1 |
| Time to 10,000' | | 4.5 |
| Time to 20,000' | | 9.5 |
| Service ceiling 33,600' | | |

### AIRCRAFT

Duty Dive Bomber

Designation Type 99, Model 22

Description Low-wing Monoplane

Mfg. Aichi

Engines 1 Crew 2

Construction All metal

### SPEED

| @ 7830 lbs. | Mph. | Knts. | Altitude |
|---|---|---|---|
| Maximum | 230 | 200 | @ S.L. |
| Maximum | 261 | 226 | @ 9,850' |
| Maximum | 281 | 244 | @ 20,300' |
| Cruising 75% | 168 | 145 | 1,500' |
| Economical | | | |

### BOMBS—CARGO

| | No. | Size | Total Lbs. |
|---|---|---|---|
| Normal | 1 | x 250 kg | 550 |
| Maximum | | | |

### ENGINES

| | H. P. | Altitude |
|---|---|---|
| Take-off | 1280 | S.L. |
| Normal | | |
| Military | 1185 | 9,850' |
| | 1085 | 20,300' |
| War Emerg. | 1355 | 7,700' |

Mfg. Mitsubishi

Model Kinsei 54

Type Radial

Cylinders 14 Cooling Air

Supercharger 2 Speed

Propeller 3 Blade Diam. 10.5'

Fuel - Take-off 92 Cruising 92

### WEIGHTS

| | Lbs. |
|---|---|
| Empty | 5670 |
| Gross - Scout | 7830 |
| Gross - Bomber | 8380 |
| Overload | 9042 |

### FUEL

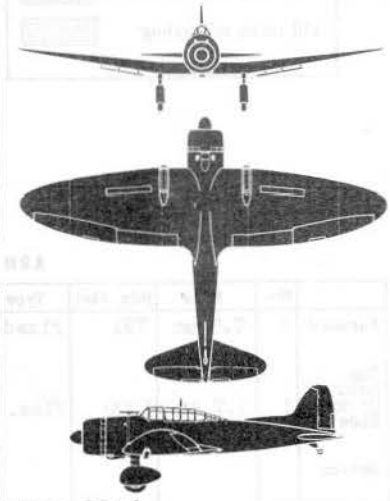
| | U.S. gal. | Imp. gal. |
|---|---|---|
| Built-in | 286 | 237 |
| Internal (Removable) | | |
| External (drop) | | |
| Maximum | 286 | 237 |

### RANGE AND RADIUS

| | Miles | | Speed | | Alt. | Fuel gal. | | Bombs | Cargo |
|---|---|---|---|---|---|---|---|---|---|
| | stat. | naut. | mph. | Knts. | feet | U. S. | Imp. | lbs. | lbs. |
| Maximum range (maximum fuel) | 1580 | 1372 | 126 | 109 | 1500 | 286 | 237 | None | None |
| At 75% Vmax. | 1285 | 1115 | 168 | 145 | 1500 | 286 | 237 | None | None |
| Maximum range (normal fuel) | 965 | 838 | 125 | 108 | 1500 | 175 | 145 | 550 | None |
| At 75% Vmax. | 785 | 682 | 167 | 144 | 1500 | 175 | 145 | 550 | None |
| Radius ( ) | | | | | | | | | |
| Radius ( ) | | | | | | | | | |

### DIMENSIONS

Span 47.5' Length 35.4'
Height 13' Wing area 376 sq.ft.



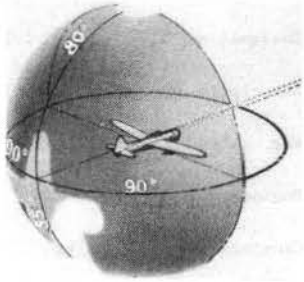
### GENERAL DATA

VAL 22 is an improved version of VAL 11, being equipped with a new, more powerful engine and a better streamlined fuselage.

Maximum Range with Maximum Fuel was calculated using a full fuel load of 286 gallons in an overload reconnaissance condition for a gross weight of 8492 lbs. Maximum Range with normal fuel was based on a reconnaissance condition of 7380 lbs. gross weight.

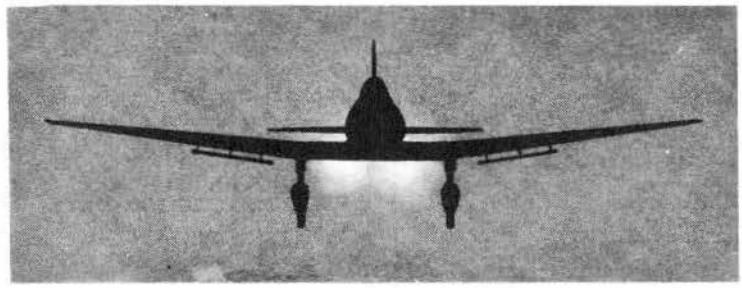
# VAL 22

## FIELDS OF FIRE



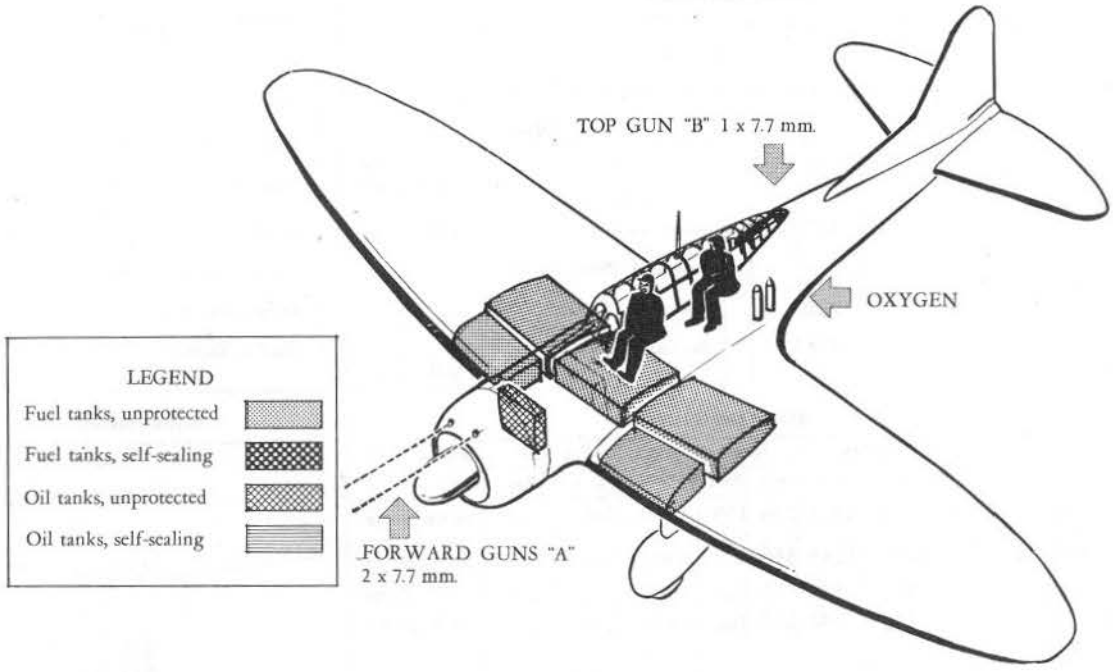

TOP GUN "B" AND
FORWARD GUNS "A"
¾-rear view from above

## EXHAUST FLAME PATTERNS



REAR VIEW

## VULNERABILITY




### ARMAMENT

| | No. | Size | Rds. Gun | Type | | No. | Size | Rds. Gun | Type |
|---|---|---|---|---|---|---|---|---|---|
| Forward | 2 | 7.7 mm | 791 | Fixed | Tail | | | | |
| Top Rear Cockpit Side | 1 | 7.7 mm | 1000 | Flex. | Wing | | | | |
| Bottom | | | | | | | | | |

### TACTICAL DATA

Up to the present time, neither fuel tank protection nor armor plate has been found on VAL.

**DATE** December 1944

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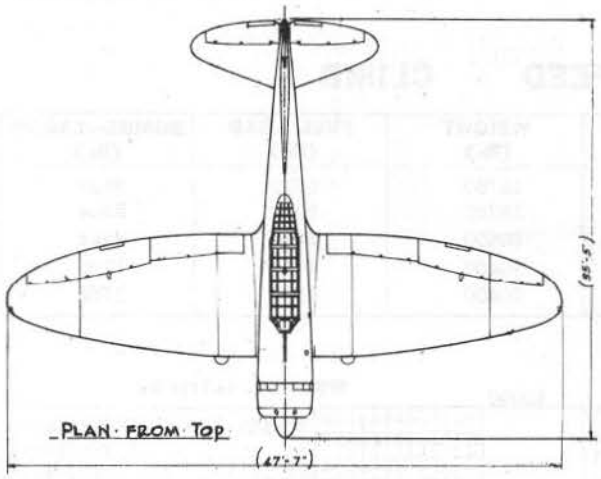
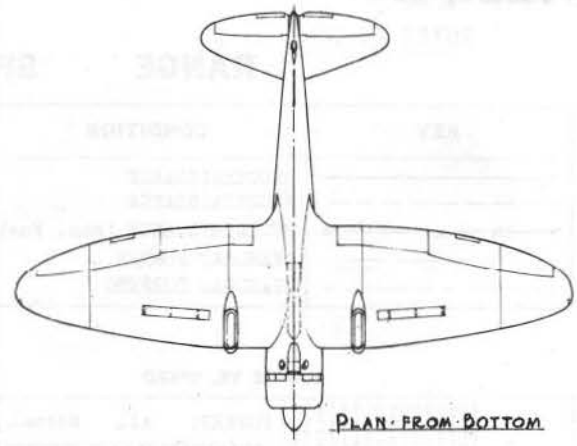
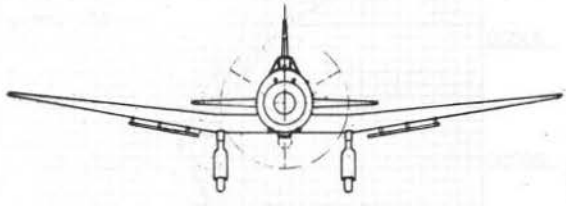
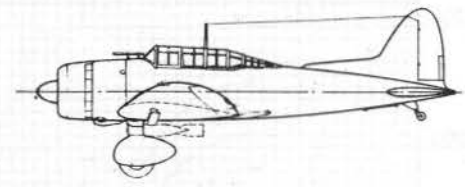
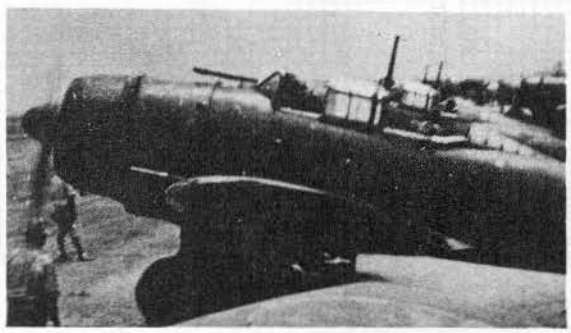
# VAL 22

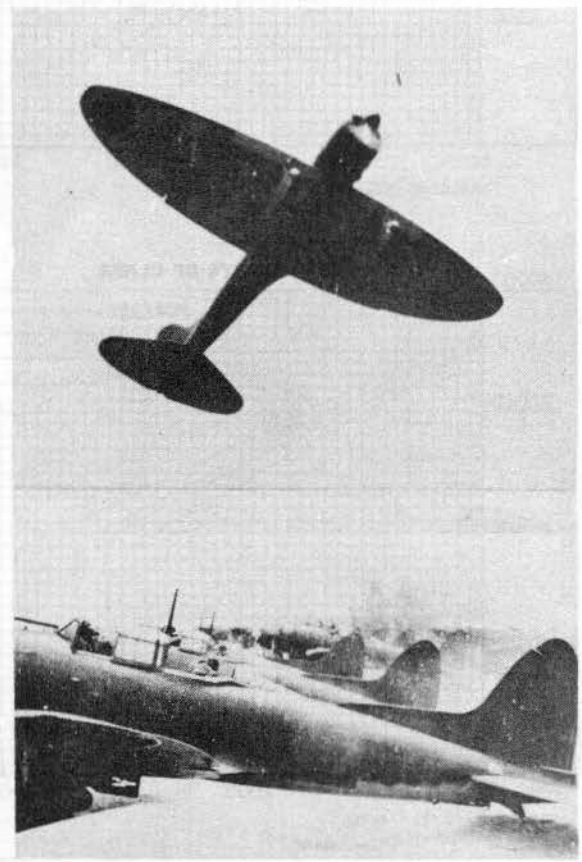






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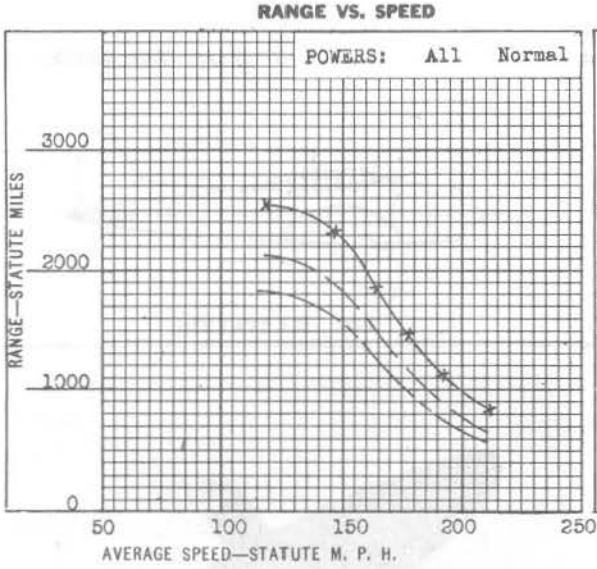
**DATE** December 1944

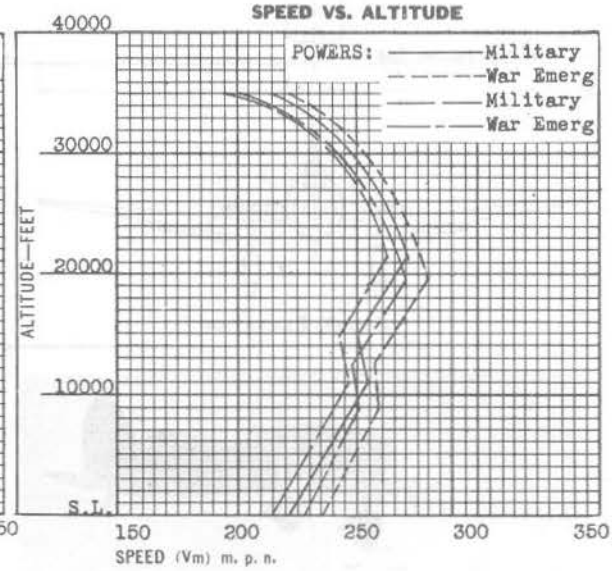
501A-1

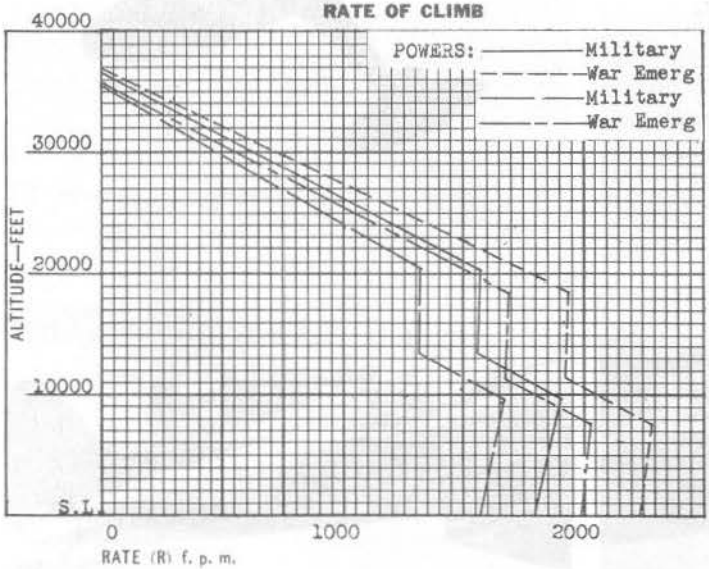
# NELL 23

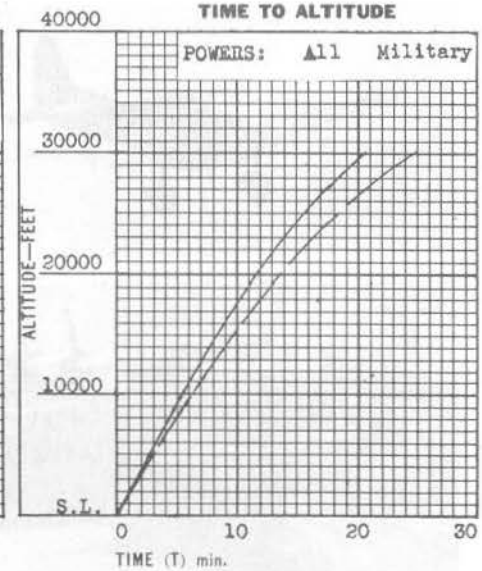
## RANGE • SPEED • CLIMB

| KEY | CONDITION | WEIGHT (lb.) | FUEL LOAD (lb.) | BOMBS—CARGO (lb.) |
|---|---|---|---|---|
| ——— | RECONNAISSANCE | 18750 | 5070 | None |
| – – – – | RECONNAISSANCE | 18750 | 5070 | None |
| ×—×—× | RECONNAISSANCE (Max. Fuel) | 20400 | 5740 | None |
| ——— ——— | OVERLOAD BOMBER | 20400 | 4770 | 1100 |
| ——— – ——— – | OVERLOAD TORPEDO | 20400 | 4150 | 1765 |




**DATE** December 1944

**RESTRICTED**

# PERFORMANCE AND CHARACTERISTICS

# NELL 23

### TAKE-OFF

| | Load | Feet |
|---|---|---|
| T.O. calm | 20400 | 1837 |
| T.O. 25 kt. wind | 20400 | 717 |
| T.O. over 50' obstacle | | |
| Landing over 50' obstacle | | |

### CLIMB—CEILING

| @ 20,400 lbs. | Feet | Min. |
|---|---|---|
| Rate @ S.L. | 1570 | 1 |
| Rate @ 9,850 ft. | 1670 | 1 |
| Time to 10,000' | | 6.2 |
| Time to 20,000' | | 13.5 |
| Service ceiling 34,250' | | |

### AIRCRAFT

Duty Medium Bomber

Designation Type 96, Model 23

Description Mid-wing Monoplane

Mfg. Nakajima

Engines 2 Crew 4-7

Construction All Metal

### SPEED

| @ 20400 lbs. | Mph. | Knts. | Altitude |
|---|---|---|---|
| Maximum | 215 | 187 | @ S.L. |
| War Emerg. | 228 | 198 | @ S.L. |
| Maximum | 262 | 227 | @ 21,400' |
| War Emerg. | 270 | 235 | @ 19,600' |
| Cruising 75% | 157 | 136 | 1,500' |
| Economical | | | |

### BOMBS—CARGO

| | No. | Size | Total Lbs. |
|---|---|---|---|
| Normal | 1 | 500 kg. | 1100 |
| or | 2 | 250 kg. | 1100 |
| or | 12 | 30 kg. | 792 |
| or | 1 | 800 kg. (Torp) | 1760 |
| Maximum | | | |
| | 1 | 800 kg. | 1760 |

### ENGINES

| | H. P. | Altitude |
|---|---|---|
| Take-off | 1280 | S.L. |
| Normal | | |
| Military | 1180 | 9,850' |
| | 1085 | 20,300' |
| War Emerg. | 1355 | 7,700' |

Mfg. Mitsubishi

Model Kinsei 53

Type Radial

Cylinders 14 Cooling Air

Supercharger 2 Speed

Propeller 3 Blade C.S. Diam. 10.5'

Fuel - Take-off 92 Cruising 92 or 87 and methanol.

### WEIGHTS

| | Lbs. |
|---|---|
| Empty | 10,950 |
| Gross | 20,400 |
| Overload | |

### FUEL

| | U.S. gal. | Imp. gal. |
|---|---|---|
| Built-in | 975 | 809 |
| Internal (Removable) | | |
| External (drop) | | |
| Maximum | 975 | 809 |

### RANGE AND RADIUS

| | Miles | | Speed | | Alt. | Fuel gal. | | Bombs | Cargo |
|---|---|---|---|---|---|---|---|---|---|
| | stat. | naut. | mph. | Knts. | feet | U. S. | Imp. | lbs. | lbs. |
| Maximum range (maximum fuel) | 2550 | 2214 | 118 | 102 | 1500 | 956 | 793 | None | None |
| At 75% Vmax. | 2050 | 1780 | 159 | 137 | 1500 | 956 | 793 | None | None |
| Maximum range (normal fuel) | 2125 | 1845 | 118 | 102 | 1500 | 795 | 660 | 1100 | None |
| At 75% Vmax. | 1690 | 1468 | 157 | 136 | 1500 | 795 | 660 | 1100 | None |
| Radius ( ) | | | | | | | | | |
| Radius ( ) | | | | | | | | | |

### DIMENSIONS

Span 82' Length 53.1'

Height Wing area 862 sq.ft.

### GENERAL DATA

NELL is now used mainly for training and transport. Now obsolescent, this plane played an important role earlier in the war. Torpedo carrying NELLS are credited with the sinking of HMS the Prince of Wales and HMS Repulse.

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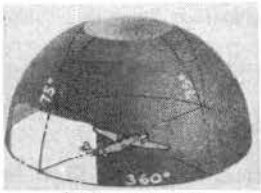
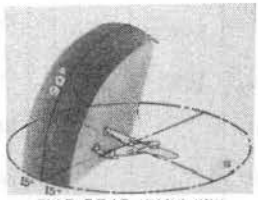
**DATE** December 1944

# NELL 23

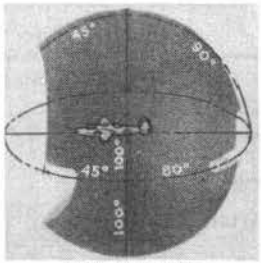
## FIELDS OF FIRE



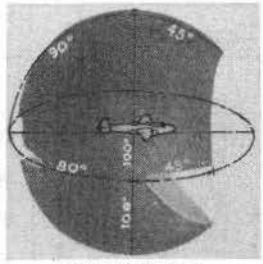

TOP GUN "A"
1 x 7.7 mm.
¾-rear view from above




TOP REAR GUN "B"
1 x 20 mm.
¾-rear view from above




SIDE GUN "C"
1 x 7.7 mm.
Side view from above



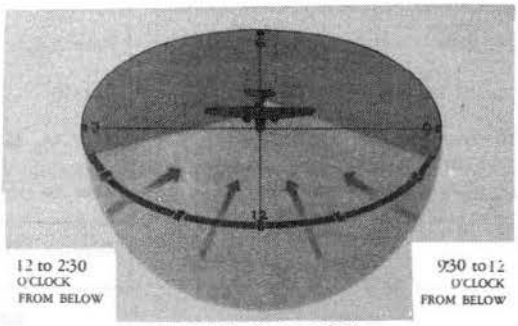

SIDE GUN "D"
1 x 7.7 mm.
Side view from above

NOTE:
1 x 7.7 mm. FORWARD GUN, aft of pilot and co-pilot, may be fired from port, st'b'd, or bottom positions.

## EXHAUST FLAME PATTERNS

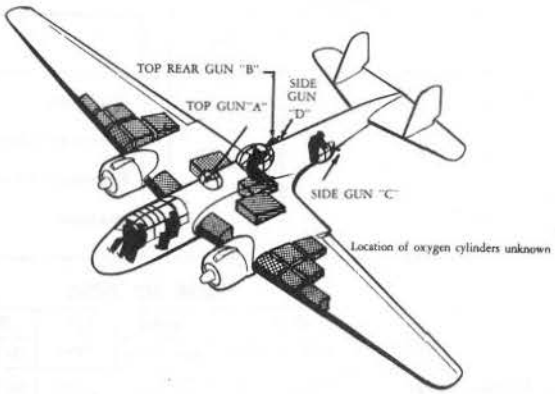
REAR VIEW

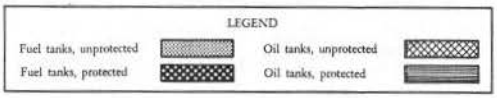
## VULNERABILITY




## FIELDS OF ATTACK

Do not attack from above




## ARMAMENT

| | No. | Size | Rds. Gun | Type | | No. | Size | Rds. Gun | Type |
|---|---|---|---|---|---|---|---|---|---|
| Forward | 1 | 7.7 mm | 300 | Flex. | Tail | | | | |
| Top Forward | 1 | 7.7 mm | 300 | Flex. | Wing | | | | |
| Top Aft | 1 | 20 mm | 60 | Turret | | | | | |
| Side | 2 | 7.7 mm | 300 | Flex. | | | | | |
| Bottom | | | | | | | | | |

## TACTICAL DATA

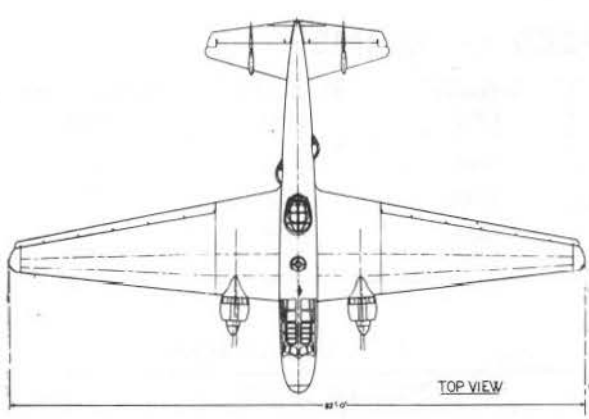
NELL has no armor protection for pilot, crew or engines. Unprotected fuel tanks are another source of weakness.

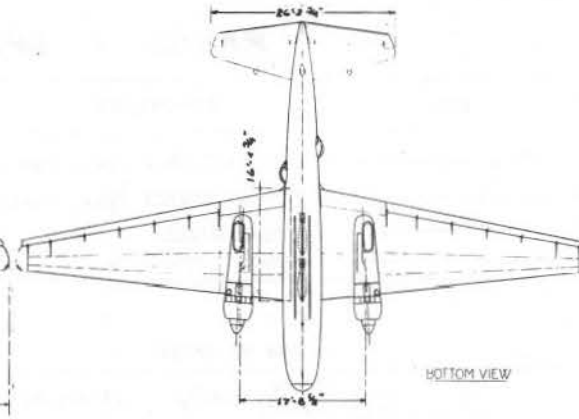
Forward 7.7 mm may be shifted to forward lateral or ventral positions.

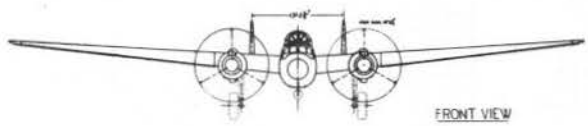
**DATE** December 1944

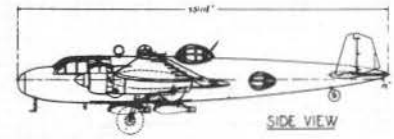
**RESTRICTED**

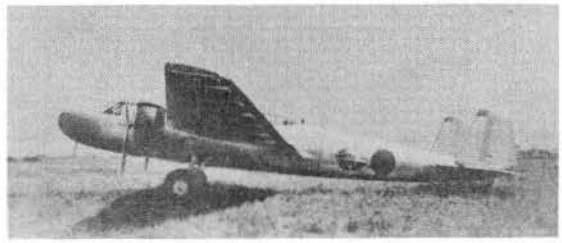
# NELL 23

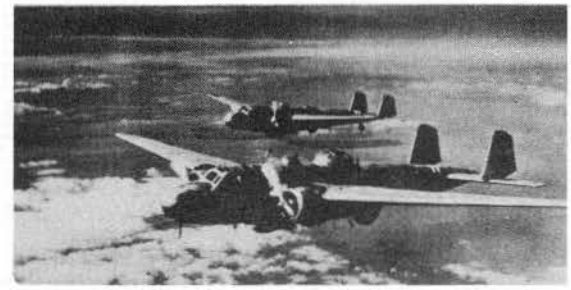


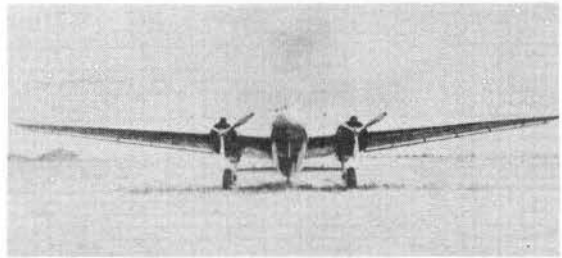



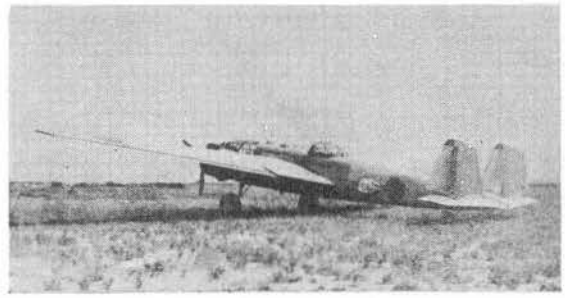



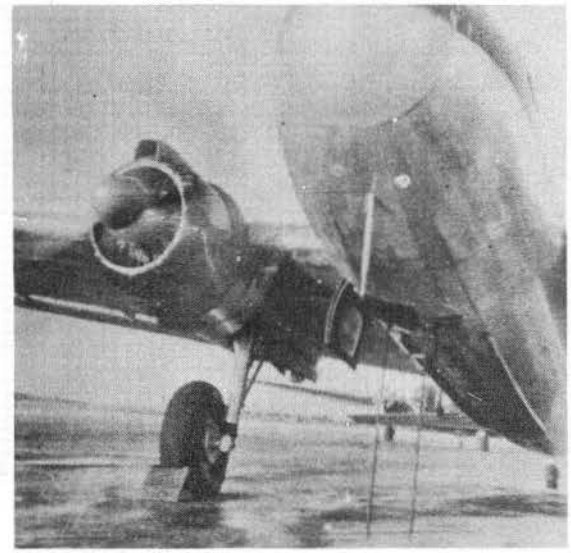











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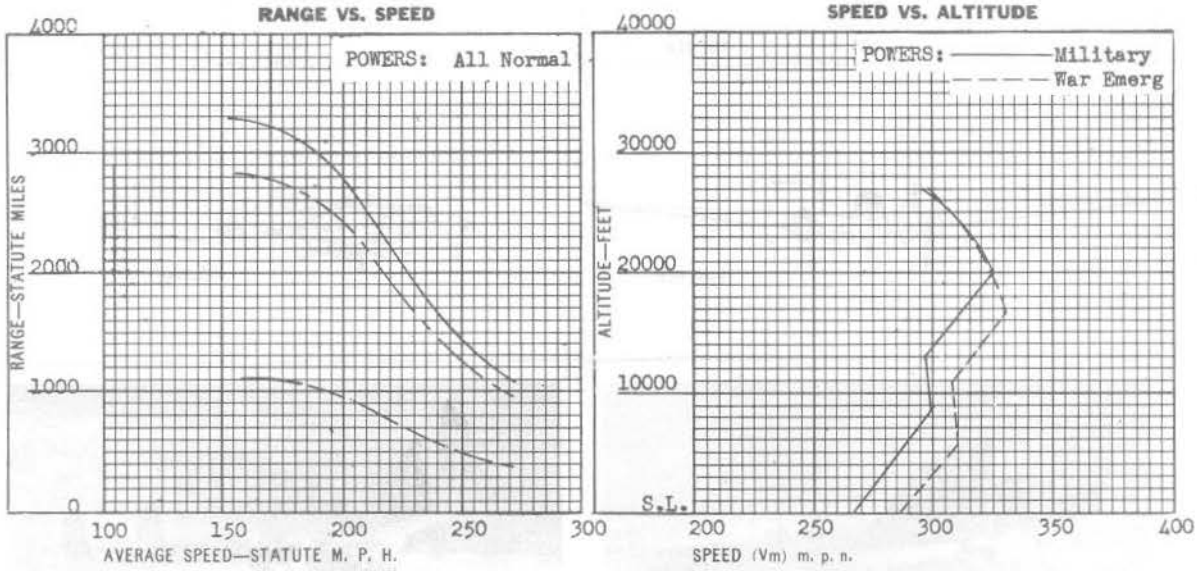
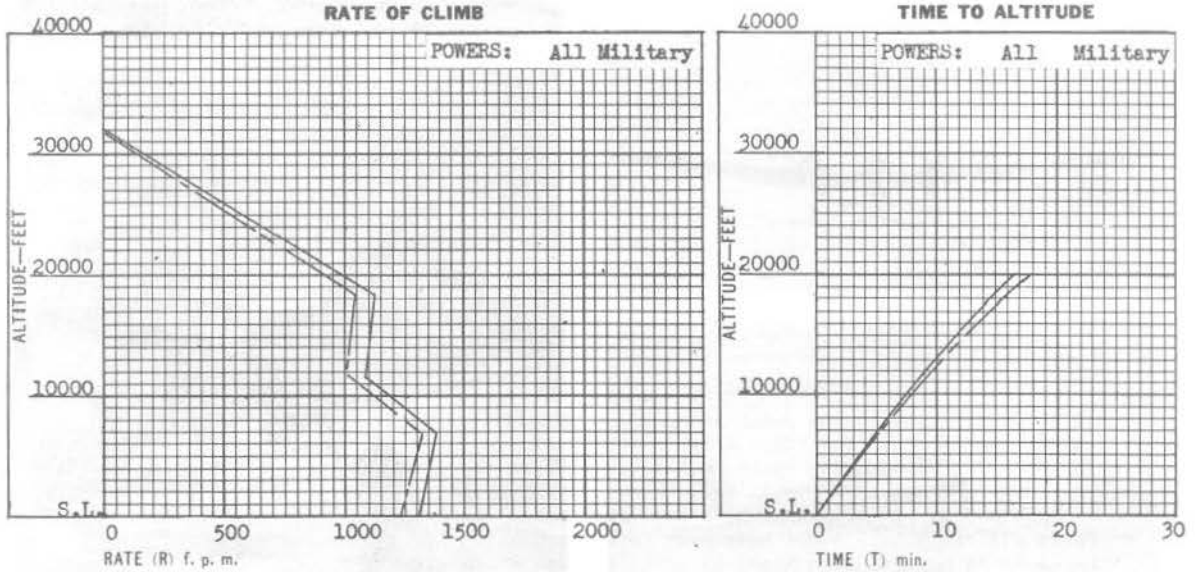
**DATE** December 1944

# BETTY 22

## RANGE • SPEED • CLIMB

| KEY | CONDITION | WEIGHT (lb.) | FUEL LOAD (lb.) | BOMBS—CARGO (lb.) |
|---|---|---|---|---|
| ——— ——— | RECONNAISSANCE (Max. Fuel) | 31980 | 10290 | None |
| – – – – – – – – – | RECONNAISSANCE (Max. Fuel) | 31980 | 10290 | None |
| ——— – ——— – | NORMAL BOMBER | 33080 | 8990 | 2205 |
| ——— ——— ——— | NORMAL TORPEDO | 32455 | 3877 | 3530 |




**DATE** December 1944

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# PERFORMANCE AND CHARACTERISTICS

# BETTY 22

## TAKE-OFF

| | Load | Feet |
|---|---|---|
| T.O. calm | 31980 | 1659 |
| T.O. 25 kt. wind | 31980 | 796 |
| T.O. over 50' obstacle | | |
| Landing over 50' obstacle | | |

## CLIMB—CEILING

| @ 31980 lbs. | Feet | Min. |
|---|---|---|
| Rate @ S.L. | 1310 | 1 |
| Rate @18,300 ft. | 1120 | 1 |
| Time to 10,000' | | 7.5 |
| Time to 20,000' | | 16.6 |
| Service ceiling 30,800' | | |

## AIRCRAFT

Duty Medium Bomber - Recco

Designation Type 1, Model 22

Description Mid-wing Monoplane

Mfg. Nakajima

Engines 2 Crew 5-7

Construction All metal

## SPEED

| @ 31980 lbs. | Mph. | Knts. | Altitude |
|---|---|---|---|
| Maximum | 267 | | @ S.L. |
| War Emerg. | 286 | 248 | |
| Maximum | 325 | | @ 16,700' |
| War Emerg. | 331 | 287 | |
| Cruising 75% | 204 | 177 | 1,500' |
| Economical | | | |

## BOMBS—CARGO

| | No. | Size | Total Lbs. |
|---|---|---|---|
| Normal | 12 | 60 kg | |
| | or | | |
| or | 4 | 250 kg | |
| or Maximum | Combination up to maximum | | 2205 |

## ENGINES

| | H. P. | Altitude |
|---|---|---|
| Take-off | 1825 | S.L. |
| Normal | 1350 | 10,000' |
| | 1260 | 20,400' |
| Military | 1655 | 6,900' |
| | 1520 | 18,300' |
| War Emerg. | 1880 | 4,400' |

Mfg. Mitsubishi

Model Kasei 21

Type Radial

Cylinders 14 Cooling Air

Supercharger 2 Speed

Propeller 4 Blade Diam. 11.3' C.S.

Fuel - Take-off 92 Cruising 92 and methanol

## WEIGHTS

| | Lbs. |
|---|---|
| Empty | 17400 |
| Gross | 31980 |
| Overload | 33080 |

## FUEL

| | U.S. gal. | Imp. gal. |
|---|---|---|
| Built-in | 1715 | 1423 |
| Internal (Removable) | | |
| External (drop) | | |
| Maximum | 1715 | 1423 |

## RANGE AND RADIUS

| | Miles | | Speed | | Alt. feet | Fuel gal. | | Bombs lbs. | Cargo lbs. |
|---|---|---|---|---|---|---|---|---|---|
| | stat. | naut. | mph. | Knts. | | U. S. | Imp. | | |
| Maximum range (maximum fuel) | 3290 | 2855 | 153 | 133 | 1500 | 1715 | 1423 | None | None |
| At 75% Vmax. | 2690 | 2335 | 204 | 177 | 1500 | 1715 | 1423 | None | None |
| Maximum range (normal fuel) | 2790 | 2420 | 163 | 141 | 1500 | 1499 | 1224 | 2205 | None |
| At 75% Vmax. | 2330 | 2025 | 204 | 177 | 1500 | 1499 | 1224 | 2205 | None |
| Radius ( ) | | | | | | | | | |
| Radius ( ) | | | | | | | | | |

## DIMENSIONS

Span 82' Length 64.5'

Height Wing area 830 sq.ft.

## GENERAL DATA

BETTY 22 definitely uses radar and carries "WINDOW" -(strips of aluminum backed paper for radar interference.)

The size of the bomb bay would permit BETTY 22 to carry two 1765 lb. torpedoes although specifications call for only one.

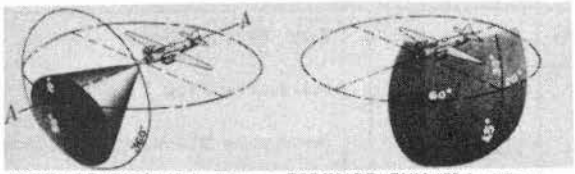
In this model, side blisters have been replaced by ports.

Three different tail cones have been found on BETTY.

BETTY 11 is powered with Kasei 11 or 15 engines which give substantially inferior performance when compared to BETTY 22.

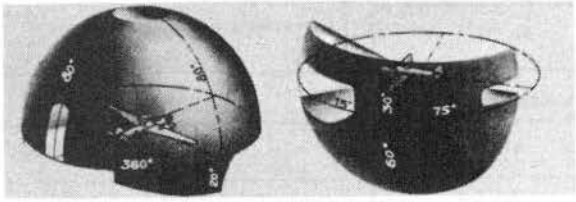
# BETTY 22

## FIELDS OF FIRE



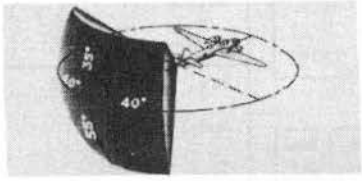
FORWARD GUN "A" 1 x 7.7 mm.
¾-front view from above
Nose rotates mechanically thru 360° about axis "A"—"A" Gun is ball and socket mounted, off center, in nose.

FORWARD GUN "B" 1 x 7.7 mm.
¾-front view from above
This gun is interchangeable from port to st'b'd. side of nose. Ball and socket mount



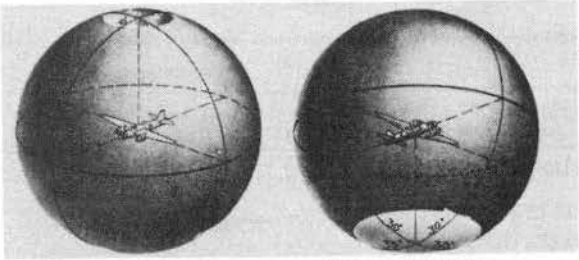
TOP GUN "C" 1 x 20 mm.
¾-rear view from above
Powered turret

SIDE GUN "D" 1 x 7.7 mm.
Approx. side view from above.
Post and sliding bar mount.
Field of fire for SIDE GUN "E" similar



TAIL GUN "F" 1 x 20 mm.
¾-rear view from above

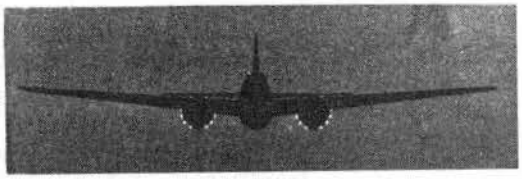
## FIRE FREE FIELDS



¾-front view from above

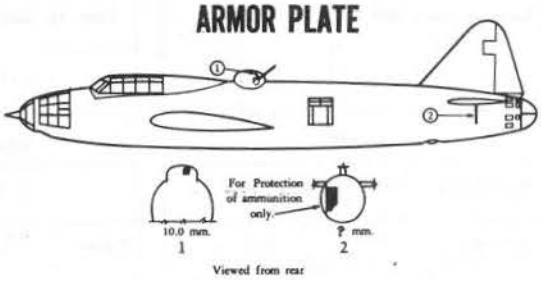
¾-front view from below.

## EXHAUST FLAME PATTERNS



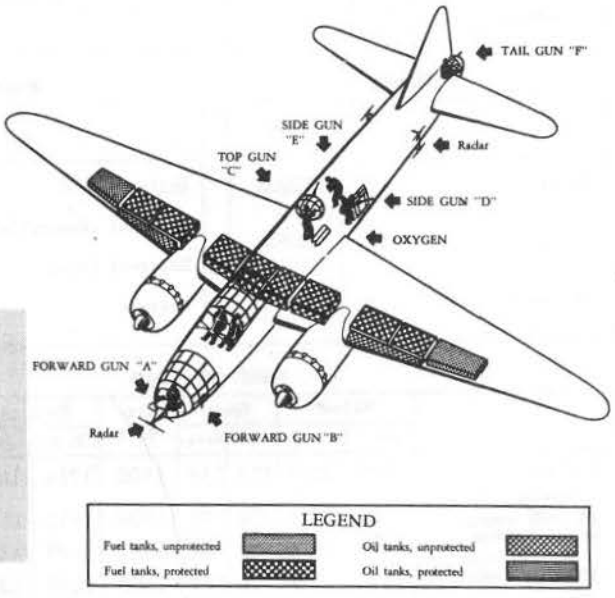
REAR VIEW

## ARMOR PLATE




Viewed from rear

## VULNERABILITY




### ARMAMENT

| | No. | Size | Rds. Gun | Type | | No. | Size | Rds. Gun | Type |
|---|---|---|---|---|---|---|---|---|---|
| Forward | 2 | 7.7 mm | 300-776 | Flex. | Tail | 1 | 20 mm | 90-360 | Flex. |
| or | 1 | 13 mm | | Flex. | | | | | |
| Top | 1 | 20 mm | 90 | Power Turret | Wing | | | | |
| Side | 2 | 7.7 mm | 300-776 | Flex. | | | | | |
| or | 2 | 20 mm | 90 | | | | | | |
| Bottom | | | | | | | | | |

### TACTICAL DATA

This is the first example of a power operated dorsal turret in use by the J.A.F.

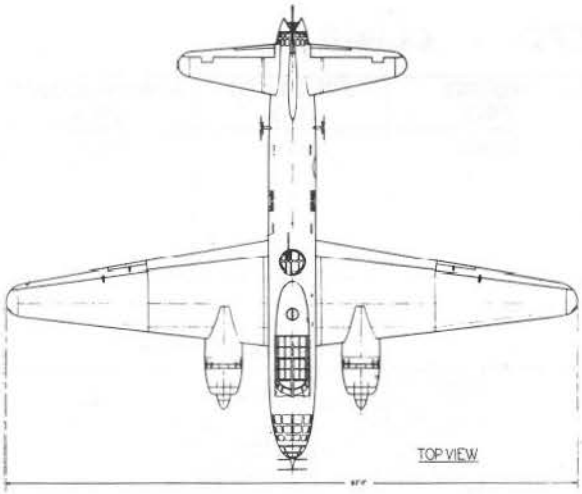
Late reports indicate some sort of leak-proofing of the fuel tanks is in use.

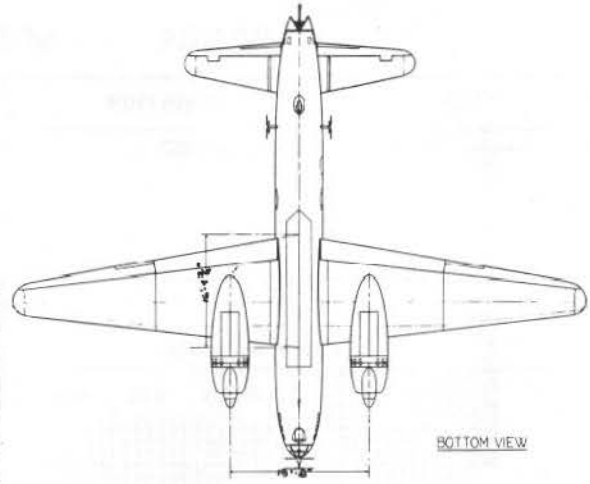
Armor plate used around turret.

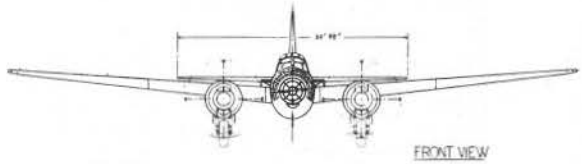
**DATE** December 1944

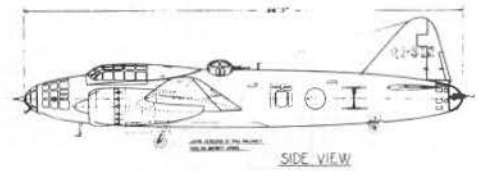
**RESTRICTED**

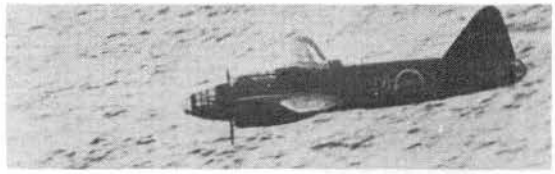
# BETTY 22

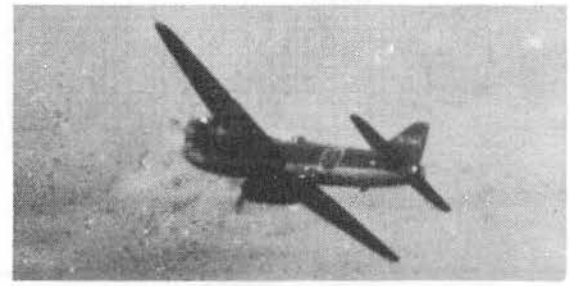


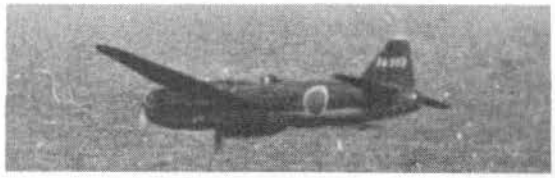



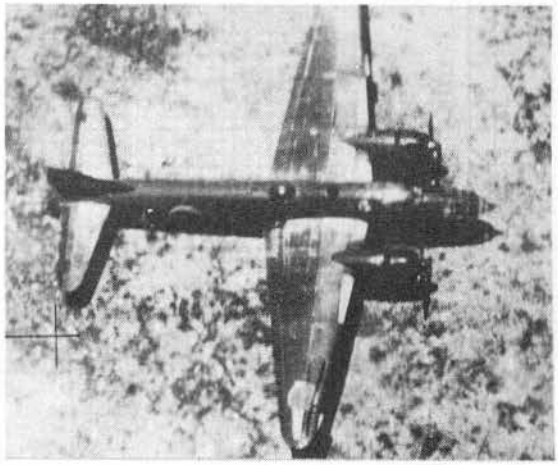



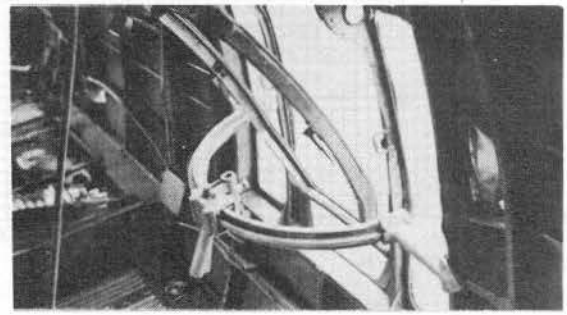









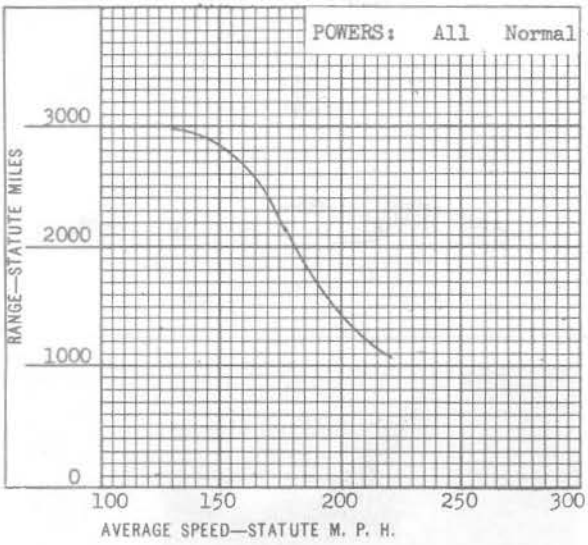


# LIZ 11

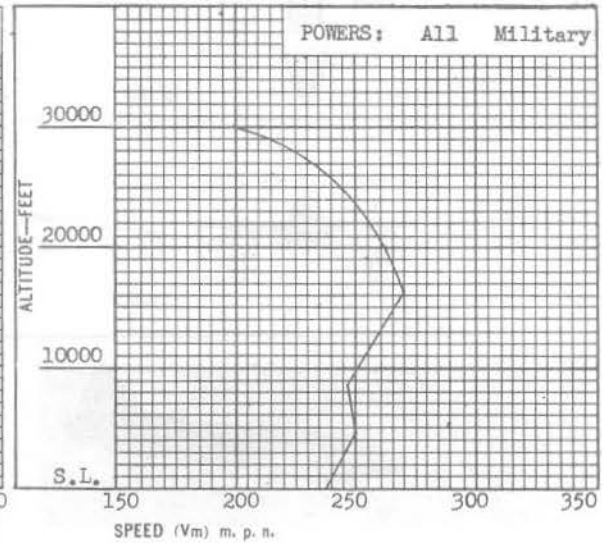
## RANGE * SPEED * CLIMB

| KEY | CONDITION | WEIGHT (lb.) | FUEL LOAD (lb.) | BOMBS—CARGO (lb.) |
|---|---|---|---|---|
| ——— | NORMAL BOMBER | 75000 | 21000 | 7240 |

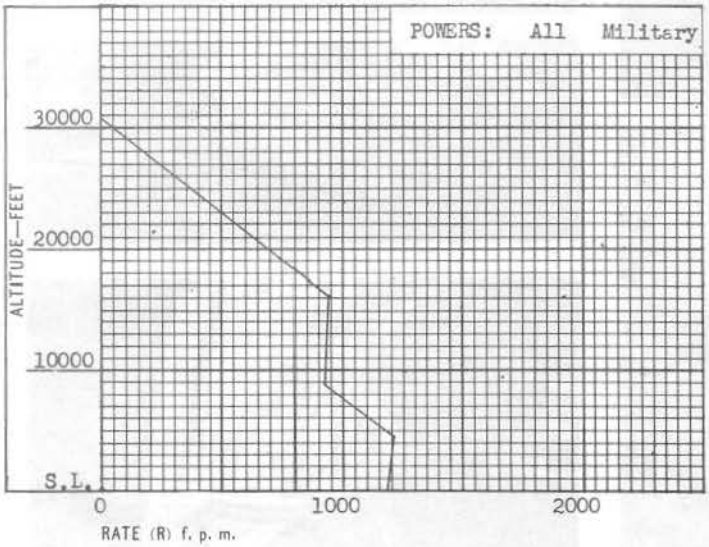
**RANGE VS. SPEED**



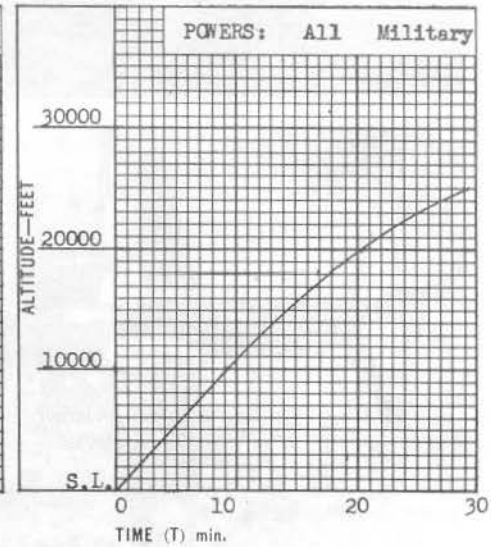

**SPEED VS. ALTITUDE**




**RATE OF CLIMB**




**TIME TO ALTITUDE**




**DATE** December 1944

**RESTRICTED**

# PERFORMANCE AND CHARACTERISTICS

# LIZ 11

## TAKE-OFF

| | Load | Feet |
|---|---|---|
| T.O. calm | 75000 | 1445 |
| T.O. 25 kt. wind | 75000 | 658 |
| T.O. over 50' obstacle | | |
| Landing over 50' obstacle | | |

## CLIMB—CEILING

| @ 75,000 lbs. | Feet | Min. |
|---|---|---|
| Rate @ S.L. | 1180 | 1 |
| Rate @ 4,600 ft. | 1205 | 1 |
| Time to 10,000' | | 9.1 |
| Time to 20,000' | | 20.4 |
| Service ceiling 29,100' | | |

## AIRCRAFT

Duty Heavy Bomber

Designation Type 2, Model 11*

Description Mid-wing Monoplane

Mfg. Mitsubishi

Engines 4 Crew

Construction All Metal

## SPEED

| @ 75000 lbs. | Mph. | Knts. | Altitude |
|---|---|---|---|
| Maximum | 238 | 207 | @ S. L. |
| Maximum | 270 | 235 | @16,100' |
| Cruising 75% | 166 | 144 | 1,500' |
| Economical | | | |

## BOMBS—CARGO

| | No. | Size | Total Lbs. |
|---|---|---|---|
| Normal | 3 | 800 kg. (Torps) | |
| or | 2 | 1500 kg. | |
| or | 4 | 800 kg. | |
| or | 12 | 250 kg. | |
| | 4 | 800 kg. Bombs | 7040 |

## ENGINES

| | H. P. | Altitude |
|---|---|---|
| Take-off | 1850 | S.L. |
| Normal | | |
| Military | 1730 | 4,600' |
| War Emerg. | 1580 | 16,100' |

Mfg. Nakajima

Model Mamoru 12

Type Radial

Cylinders 14 Cooling Air

Supercharger 2 Speed

Propeller 4 Blade Diam. 13.0' C.S.

Fuel - Take-off 92 Cruising 92

## WEIGHTS

| | Lbs. |
|---|---|
| Empty | 40,000 |
| Gross | 75,000 |
| Overload | |

## FUEL

| | U.S. gal. | Imp. gal. |
|---|---|---|
| Built-in | 3500 | 2905 |
| Internal (Removable) | | |
| External (drop) | | |
| Maximum | 3500 | 2905 |

## RANGE AND RADIUS

| | Miles | | Speed | | Alt. feet | Fuel gal. | | Bombs lbs. | Cargo lbs. |
|---|---|---|---|---|---|---|---|---|---|
| | stat. | naut. | mph. | Knts. | | U. S. | Imp. | | |
| Maximum range (maximum fuel) | 2990 | 2676 | 129 | 111 | 1500 | 3500 | 2905 | 7040 | None |
| At 75% Vmax. Maximum range (normal fuel) | 2540 | 2205 | 166 | 144 | 1500 | 3500 | 2905 | 7040 | None |
| Radius ( ) | | | | | | | | | |
| Radius ( ) | | | | | | | | | |

## DIMENSIONS

Span 138.3' Length 101.7'

Height Wing area 2230 sq.ft.

## GENERAL DATA

This plane has apparently proven unsatisfactory as a heavy bomber and is now used as transport.

Gross and empty weights, fuel capacity, and propeller diameter are estimated.

* Has also been listed as Model 12

**RESTRICTED** **DATE** December 1944

# LIZ 11

Vulnerability, Fields of Fire, etc.

**ARMAMENT**

| | No. | Size | Rds. Gun | Type | | No. | Size | Rds. Gun | Type |
|---|---|---|---|---|---|---|---|---|---|
| Forward | | | | | Tail | | | | |
| Top | | | | | Wing | | | | |
| Side | | | | | | | | | |
| Bottom | | | | | | | | | |

**TACTICAL DATA**

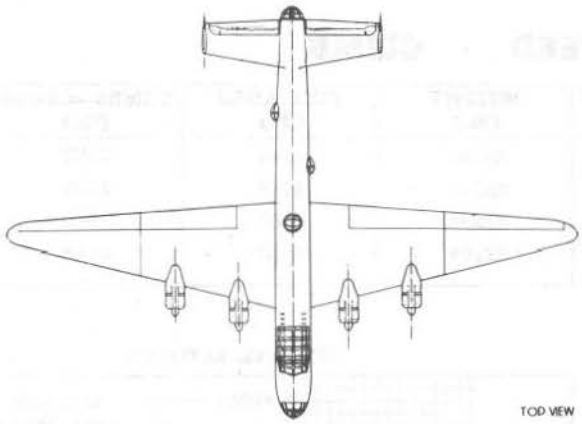
No information available.

**DATE** December 1944

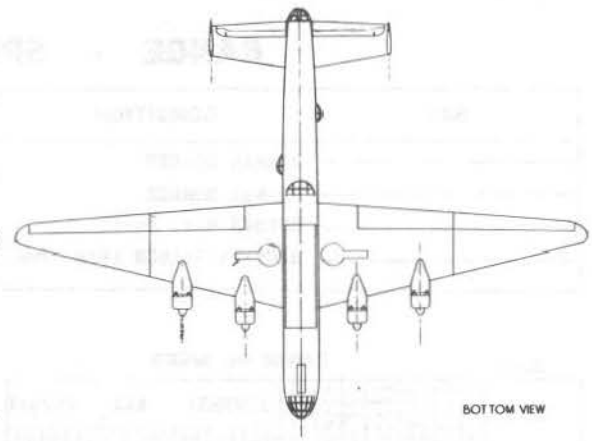
**RESTRICTED**

503A-4

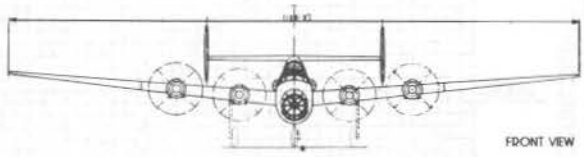
# LIZ 11



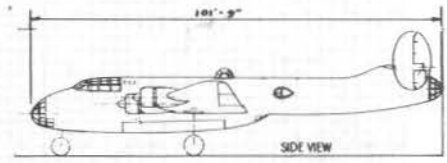
TOP VIEW



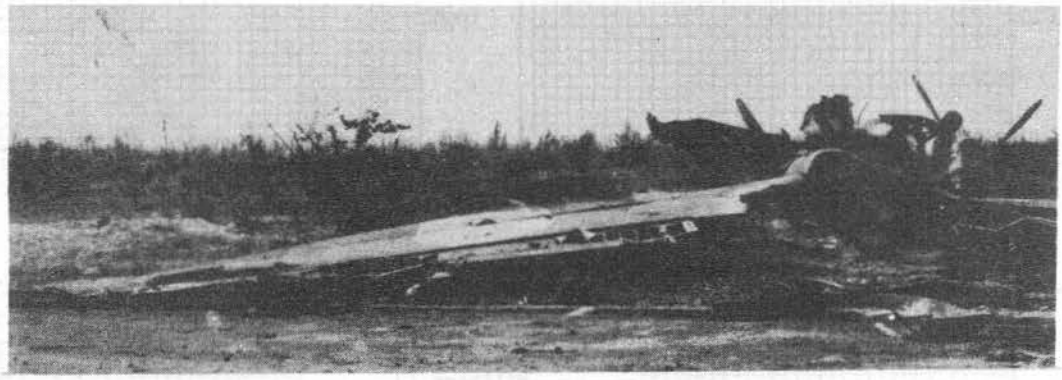
BOTTOM VIEW

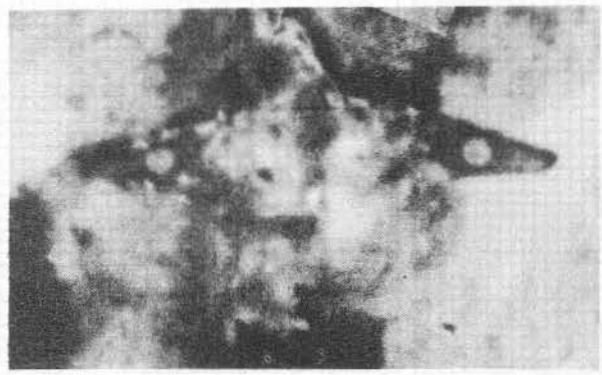


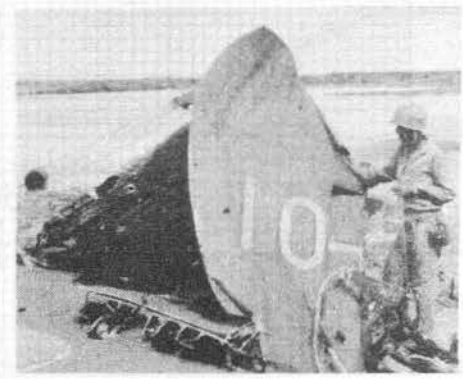
FRONT VIEW



SIDE VIEW







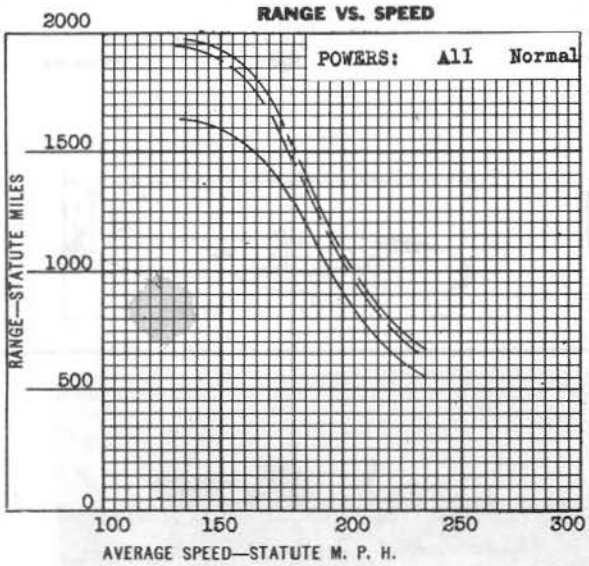
**RESTRICTED**

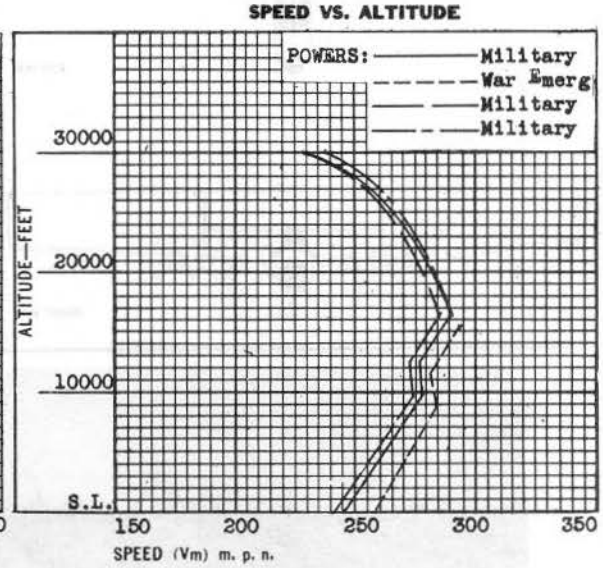
**DATE** December 1944

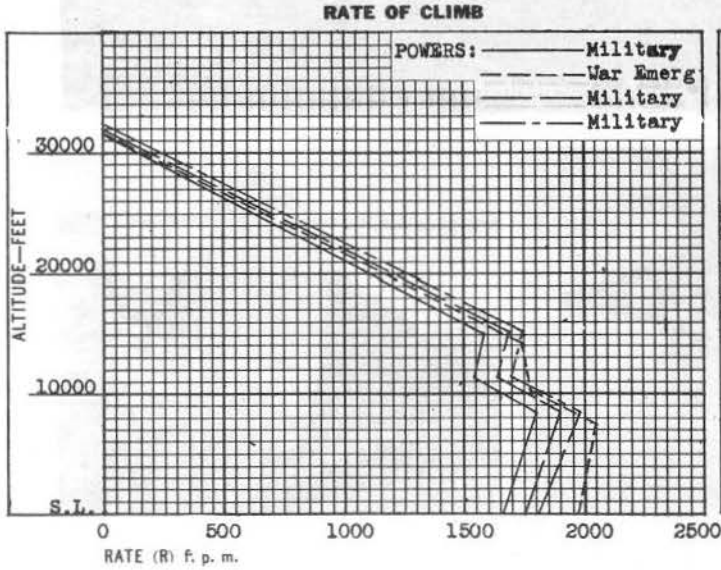
# SALLY 2

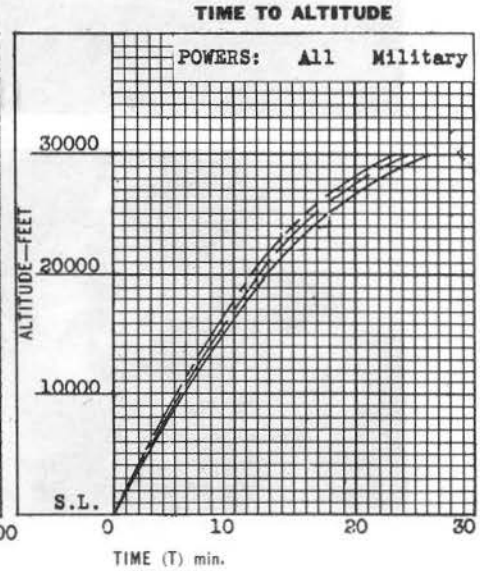
## RANGE * SPEED * CLIMB

| KEY | CONDITION | WEIGHT (lb.) | FUEL LOAD (lb.) | BOMBS—CARGO (lb.) |
|---|---|---|---|---|
| ——— | NORMAL BOMBER | 23500 | 4146 | 2200 |
| – – – – | NORMAL BOMBER | 23500 | 4146 | 2200 |
| ——— ——— | BOMBER Max. Fuel | 22604 | 4932 | 440 |
| ——— – ——— – | RECONNAISSANCE (Max. Fuel) | 22164 | 4932 | None |



# PERFORMANCE AND CHARACTERISTICS

# SALLY 2

## TAKE-OFF

| | Load | Feet |
|---|---|---|
| T.O. calm | 23500 | 900 |
| T.O. 25 kt. wind | 23500 | 388 |
| T.O. over 50' obstacle | | |
| Landing over 50' obstacle | | |

## CLIMB—CEILING

| @ 23500 lbs. | Feet | Min. |
|---|---|---|
| Rate @ S.L. | 1665 | 1 |
| Rate @ 8550 ft. | 1800 | 1 |
| Time to 10,000' | | 5.8 |
| Time to 20,000' | | 12.6 |
| Service ceiling 30,500' | | |

## AIRCRAFT

Duty Medium Bomber

Designation Ki 57, Type 97

Description Low Mid-wing Monoplane

Mfg. Mitsubishi

Engines 2 Crew 4-7

Construction All Metal

## SPEED

| @ 23500 lbs. | Mph. | Knts. | Altitude |
|---|---|---|---|
| Maximum | 246 | 213 | @ S. L. |
| War Emerg. | 258 | 223 | @ S. L. |
| Maximum | 291 | 252 | @ 16,400' |
| War Emerg. | 294 | 255 | @ 15,400' |
| Cruising 75% | 176 | 153 | 1,500' |
| Economical | | | |

## BOMBS—CARGO

| | No. | Size | Total Lbs. |
|---|---|---|---|
| Normal | 16 | 50 kg | 1760 |
| or | 9 | 100 kg | 1980 |
| or | 4 | 250 kg | 2200 |
| or Maximum | 2 | 500 kg | 2200 |
| | 2 | 500 kg. | 2200 |

## ENGINES

| | H. P. | Altitude |
|---|---|---|
| Take-off | 1490 | S.L. |
| Normal | | |
| Military | 1445 | 8,550' |
| | 1360 | 15,100' |
| War Emerg. | 1580 | 7,500' |

Mfg. Mitsubishi

Model Type 100, 1450 h.p.

Type Radial

Cylinders 14 Cooling Air

Supercharger 2 Speed

Propeller 3 Blade C.S. Diam. 11.1'

Fuel - Take-off 92 Cruising 92

## WEIGHTS

| | Lbs. |
|---|---|
| Empty | |
| Gross Normal Bomber | 23500 |
| Overload | |

## FUEL

| | U.S. gal. | Imp. gal. |
|---|---|---|
| Built-in | 691 | 573 |
| Internal (Removable) | 131 | 109 |
| External (drop) | | |
| Maximum | 822 | 682 |

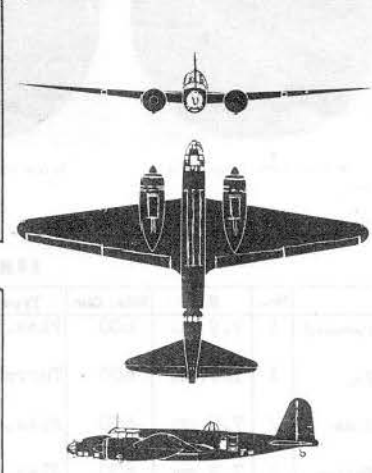
## RANGE AND RADIUS

| | Miles | | Speed | | Alt. | Fuel gal. | | Bombs | Cargo |
|---|---|---|---|---|---|---|---|---|---|
| | stat. | naut. | mph. | Knts. | feet | U. S. | Imp. | lbs. | lbs. |
| Maximum range (maximum fuel) | 1945 | 1689 | 132 | 114 | 1500 | 822 | 682 | 440 | None |
| At 75% Vmax. | 1595 | 1385 | 174 | 151 | 1500 | 822 | 682 | 440 | None |
| Maximum range (normal fuel) | 1635 | 1420 | 133 | 115 | 1500 | 691 | 573 | 2200 | None |
| At 75% Vmax. | 1350 | 1172 | 176 | 153 | 1500 | 691 | 573 | 2200 | None |
| Radius ( ) | | | | | | | | | |
| Radius ( ) | | | | | | | | | |

## DIMENSIONS

Span 74.6' Length 53'

Height Wing area 768 sq.ft.

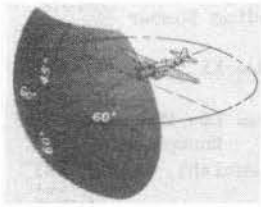


## GENERAL DATA

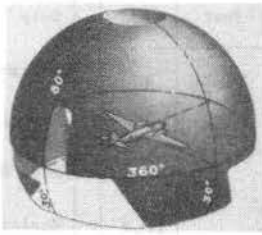
SALLY with the dorsal turret has at times been designated as SALLY 3. It is now determined that the proper designation is SALLY 2. For maximum fuel condition an internal tank is carried in the bomb bay and four x 50 kg. bombs are carried externally. SALLY is being replaced by PEGGY.

# SALLY 2

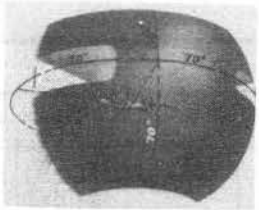
## FIELDS OF FIRE



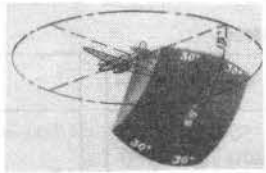
FORWARD GUN "A" 1 x 7.9 mm.
¾-front view from above
Alternate, 1 x 7.7 mm.



TOP GUN "B" 1 x 12.7 mm.
¾-rear view from above
Manually operated turret



SIDE GUN "C" 1 x 7.9 mm.
Approx. side view from below.
Field of fire for SIDE GUN "D" similar
Alternate, 1 x 7.7 mm.

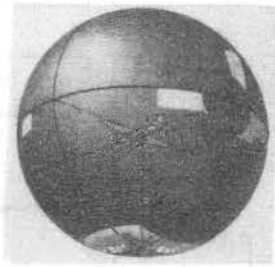


BOTTOM GUN "E" 1 x 7.9 mm.
¾-rear view from below.
Alternate, 1 or 2 x 7.7 mm.

TAIL GUN "F" 1 x 7.7 mm.
¾-rear view from above
Remote controlled by turret gunner.

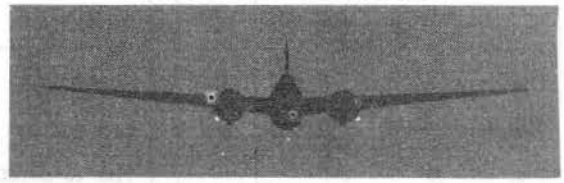
## FIRE FREE FIELDS

¾-front view from above



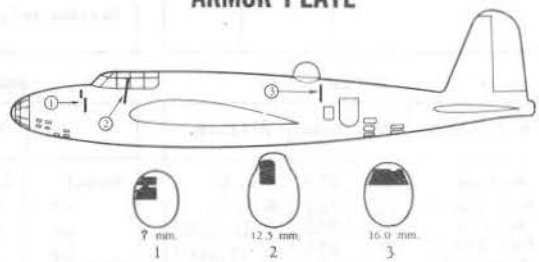
¾-rear view from below.

## EXHAUST FLAME PATTERNS



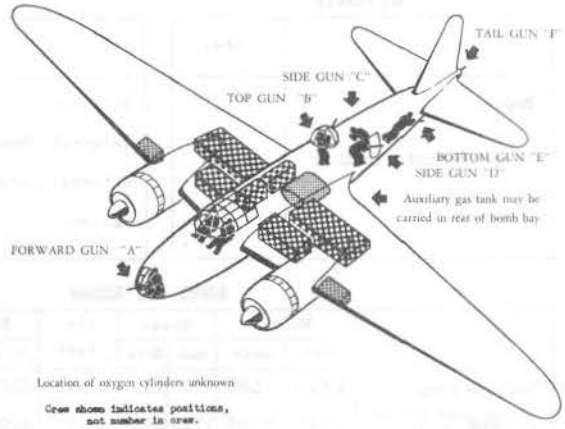
REAR VIEW

## ARMOR PLATE




Viewed from rear

## VULNERABILITY




Location of oxygen cylinders unknown

Crew shown indicates positions, not number in crew.

LEGEND

| | | | |
|---|---|---|---|
| Fuel tanks, unprotected | | Oil tanks, unprotected | |
| Fuel tanks, protected | | Oil tanks, protected | |

### ARMAMENT

| | No. | Size | Rds. Gun | Type | | No. | Size | Rds. Gun | Type |
|---|---|---|---|---|---|---|---|---|---|
| Forward | 1 | 7.9 mm | 600 | Flex. | Tail | 1 | 7.7 mm | 600 | Flex. |
| Top | 1 | 12.7mm | 600 | Turret | Wing | | | | |
| Side | 2 | 7.9 mm | 600 | Flex. | | | | | |
| Bottom | 1 | 7.9 mm | 600 | Flex. | | | | | |

### TACTICAL DATA

Fuel tanks have partial leak protection with rubber laminated covering. Armor plates are found around the dorsal turret.

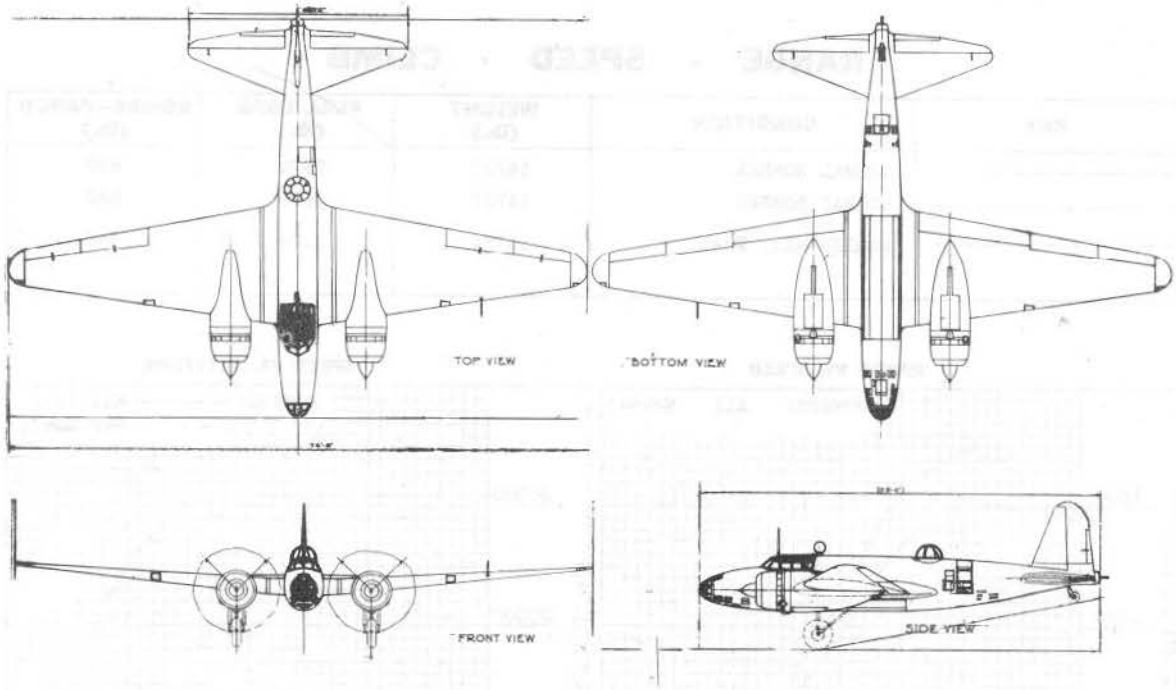
Top turret is bicycle pedal operated in traverse.

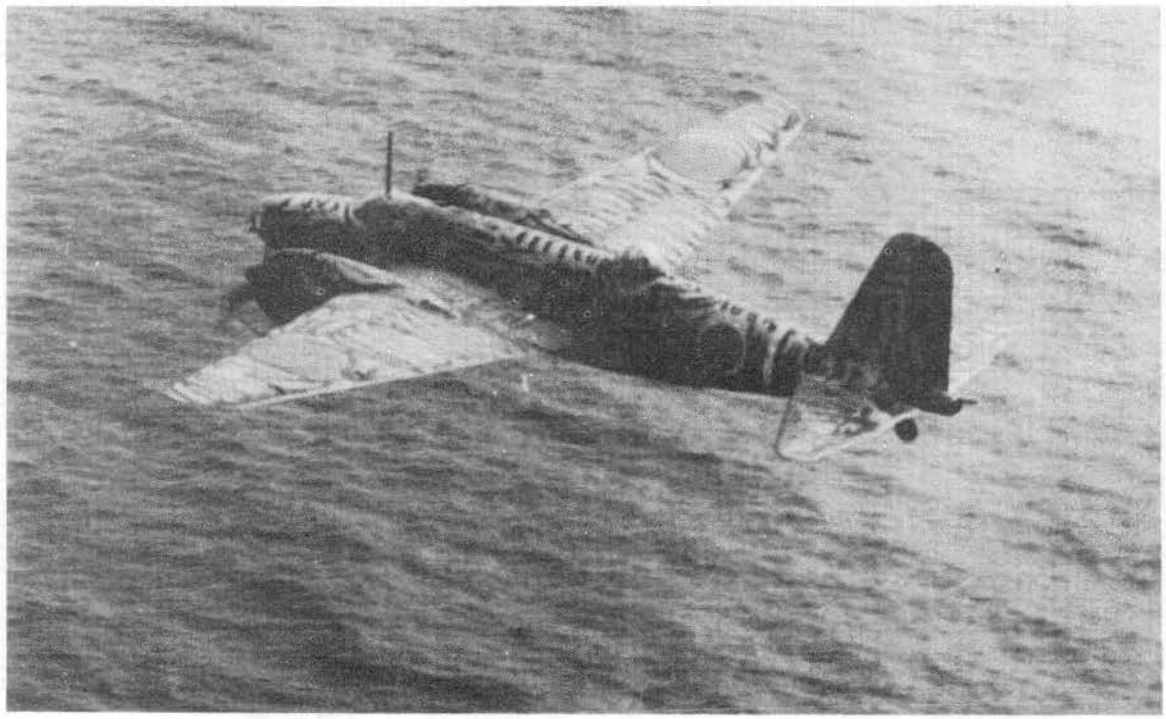
**DATE** December 1944

**RESTRICTED**

551A-4

# SALLY 2



**RESTRICTED**

**DATE** December 1944

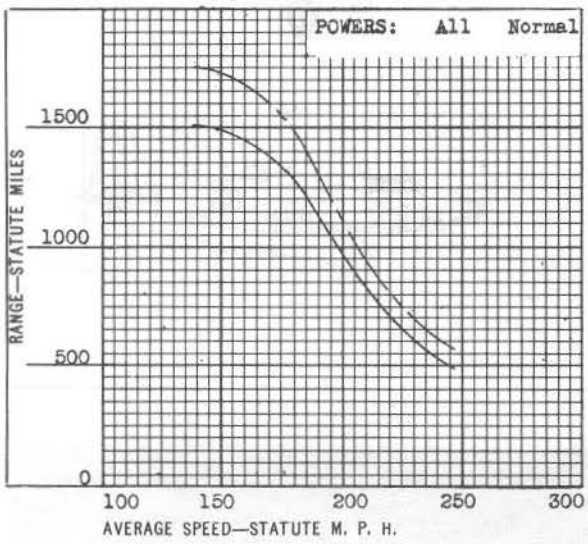
552A-1

# LILY 2

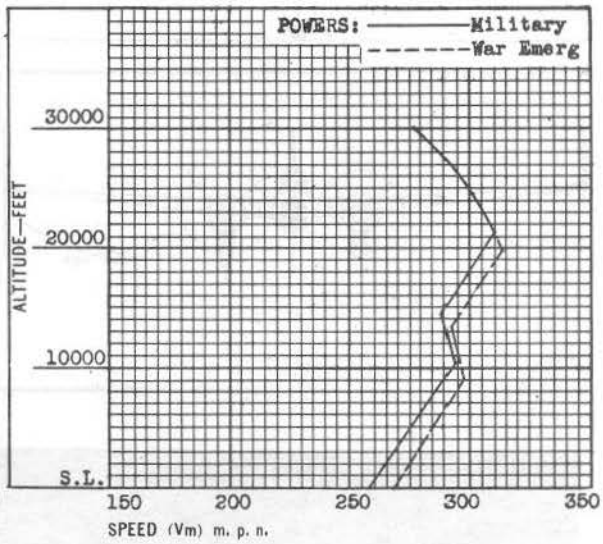
## RANGE * SPEED * CLIMB

| KEY | CONDITION | WEIGHT (lb.) | FUEL LOAD (lb.) | BOMBS—CARGO (lb.) |
|---|---|---|---|---|
| ——— | NORMAL BOMBER | 14730 | 2670 | 880 |
| - - - - - - - - - - | NORMAL BOMBER | 14730 | 2670 | 880 |
| ——— - - ——— - - | BOMBER Max. Fuel | 14774 | 3104 | 440 |

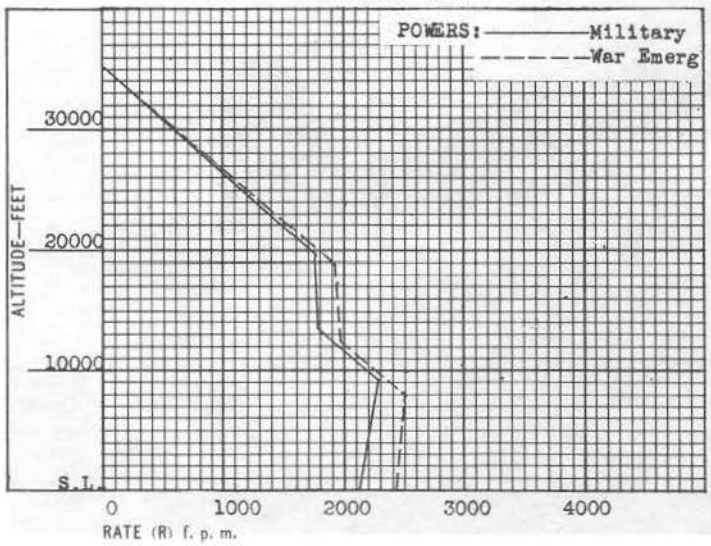
**RANGE VS. SPEED**



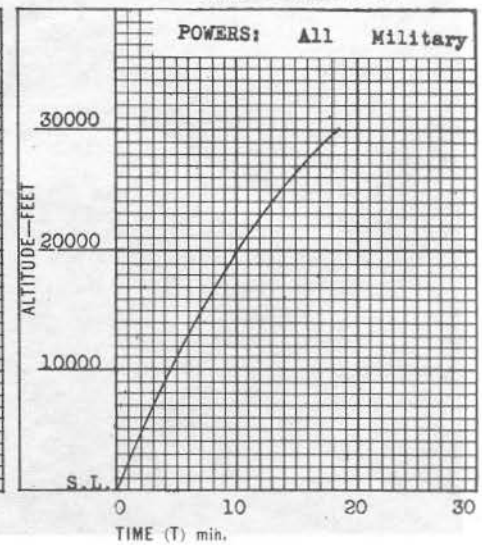

**SPEED VS. ALTITUDE**




**RATE OF CLIMB**




**TIME TO ALTITUDE**




**DATE** December 1944

**RESTRICTED**

# PERFORMANCE AND CHARACTERISTICS

# LILY 2

## TAKE-OFF

| | Load | Feet |
|---|---|---|
| T.O. calm | 14730 | 806 |
| T.O. 25 kt. wind | 14730 | 364 |
| T.O. over 50' obstacle | | |
| Landing over 50' obstacle | | |

## CLIMB—CEILING

| @ 14,730 lbs. | Feet | Min. |
|---|---|---|
| Rate @ S.L. | 2120 | 1 |
| Rate @ 9,200 ft. | 2280 | 1 |
| Time to 10,000' | | 4.6 |
| Time to 20,000' | | 10.0 |
| Service ceiling 34,300' | | |

## AIRCRAFT

Duty Light Bomber

Designation Ki 48, Type 99

Description Low-Mid-wing Monoplane

Mfg. Kawasaki

Engines 2 Crew 4-5

Construction All Metal

## SPEED

| @14,730 lbs. | Mph. | Knts. | Altitude |
|---|---|---|---|
| Maximum | 258 | 223 | @ S.L. |
| War Emerg. | 268 | 233 | @ S.L. |
| Maximum | 310 | 269 | @ 20,700' |
| War Emerg. | 313 | 271 | @ 19,900' |
| Cruising 75% | 185 | 160 | 1,500' |
| Economical | | | |

## BOMBS—CARGO

| | No. | Size | Total Lbs. |
|---|---|---|---|
| Normal | 6 | 50 kg. | 660 |
| or | 4 | 50 kg. | 440 |
| or | 4 | 100 kg. | 880 |
| Maximum | 4 | 100 kg. | 880 |

## ENGINES

| | H. P. | Altitude |
|---|---|---|
| Take-off | 1105 | S.L. |
| Normal | | |
| Military | 1085 | 9,200' |
| | 965 | 19,700' |
| War Emerg. | 1165 | 8,000' |

Mfg. Kawasaki and Nakajima

Model Type 2, 1150 h.p.

Type Radial

Cylinders 14 Cooling Air

Supercharger 2 Speed

Propeller 3 Blade Diam. 9.5'

Fuel - Take-off 92 Cruising 92

## WEIGHTS

| | Lbs. |
|---|---|
| Empty | 9790 |
| Gross Normal Bomber | 14730 |
| Overload | |

## FUEL

| | U.S. gal. | Imp. gal. |
|---|---|---|
| Built-in | 445 | 369 |
| Internal (Removable) | 73 | 61 |
| External (drop) | | |
| Maximum | 518 | 430 |

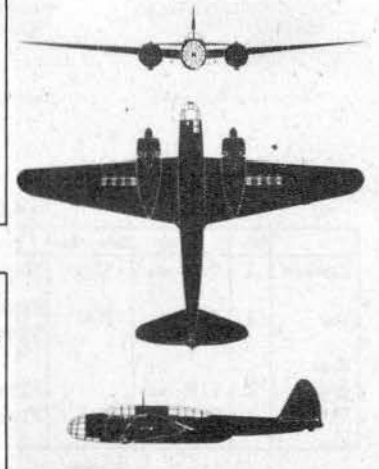
## RANGE AND RADIUS

| | Miles | | Speed | | Alt. | Fuel gal. | | Bombs | Cargo |
|---|---|---|---|---|---|---|---|---|---|
| | stat. | naut. | mph. | Knts. | feet | U. S. | Imp. | lbs. | lbs. |
| Maximum range (maximum fuel) | 1750 | 1520 | 139 | 120 | 1500 | 518 | 430 | 440 | None |
| At 75% Vmax. | 1410 | 1225 | 185 | 160 | 1500 | 518 | 430 | 440 | None |
| Maximum range (normal fuel) | 1505 | 1307 | 138 | 120 | 1500 | 445 | 369 | 880 | None |
| At 75% Vmax. | 1215 | 1055 | 185 | 160 | 1500 | 445 | 369 | 880 | None |
| Radius ( ) | | | | | | | | | |
| Radius ( ) | | | | | | | | | |

## DIMENSIONS

Span 57.3' Length 42.1'

Height Wing area 452 sq.ft.

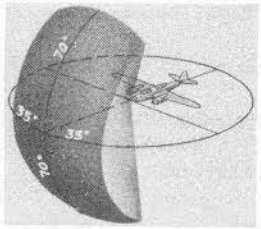


## GENERAL DATA

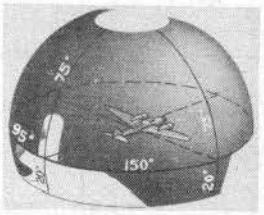
LILY has seen long service with the Japanese Army Air Force. Recently this plane has undergone a number of modifications. Dive brakes have been added but are seldom used. Armor plate is installed plus heavier fire power including a 12.7 mm gun in dorsal turret.

# LILY 2

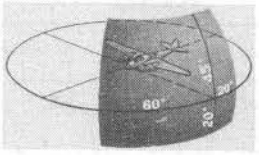
## FIELDS OF FIRE



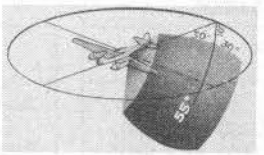

FORWARD GUN "A" 1 x 7.9 mm.
¾-front view from above




TOP GUN "C" 1 x 12.7 mm.
¾-rear view from above
Manually operated turret

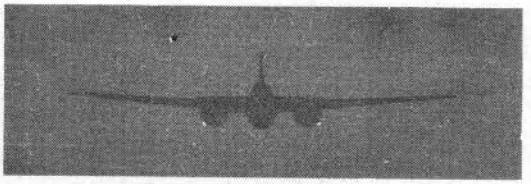



FORWARD GUN "B" 1 x 7.9 mm.
¾-front view from above
This gun is interchangeable from port to st'b'd. side of nose.



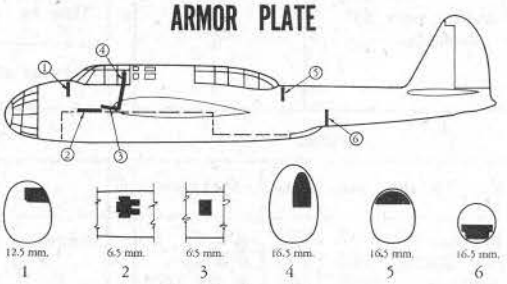

BOTTOM GUN "D"
1 x 7.9 mm. or 2 x 7.7 mm.
¾-rear view from below.

## EXHAUST FLAME PATTERNS



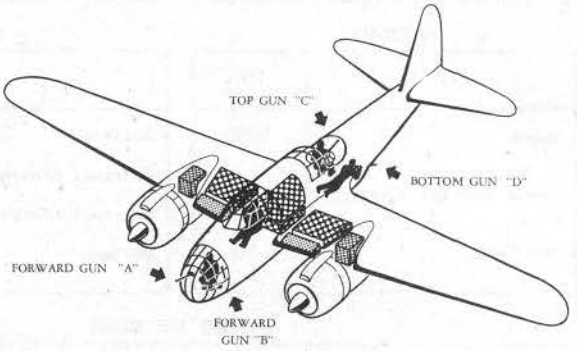
REAR VIEW

## ARMOR PLATE

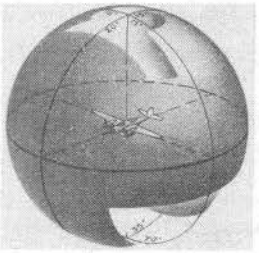



Viewed from front and above

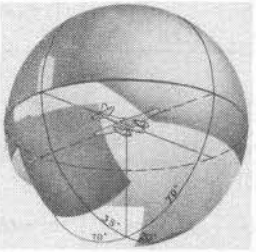
## VULNERABILITY




## FIRE FREE FIELDS



¾-front view from above



¾-rear view from below.

LEGEND

| | | | |
|---|---|---|---|
| Fuel tanks, unprotected | | Oil tanks, unprotected | |
| Fuel tanks, protected | | Oil tanks, protected | |

## ARMAMENT

| | No. | Size | Rds. Gun | Type | | No. | Size | Rds. Gun | Type |
|---|---|---|---|---|---|---|---|---|---|
| Forward | 1 | 7.9 mm | 525 | Flex. | Tail | | | | |
| Top | 1 | 12.7mm | 700 | Hand Turret | Wing | | | | |
| Side | | | | | | | | | |
| Aux. Nose | 1 | 7.9 mm | | Flex. | | | | | |
| Bottom | 1 | 7.9 mm | 525 | Flex. | | | | | |

## TACTICAL DATA

LILY is heavily armored. In addition to pilot protection, plates are installed aft for the gunner.

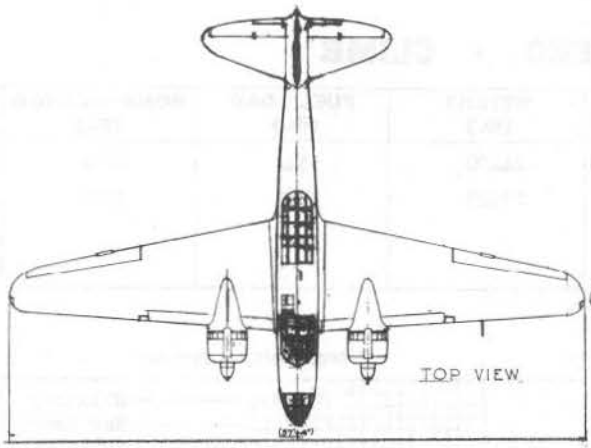
Fuel tank protection is installed.

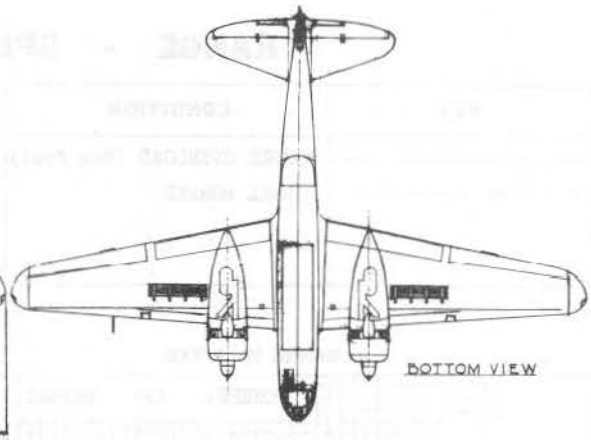
**DATE** March 1945

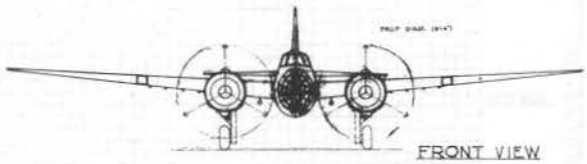
**RESTRICTED**

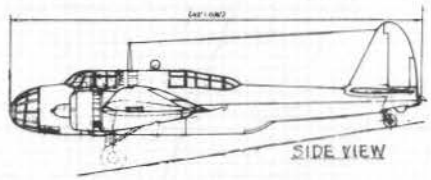
552A-4

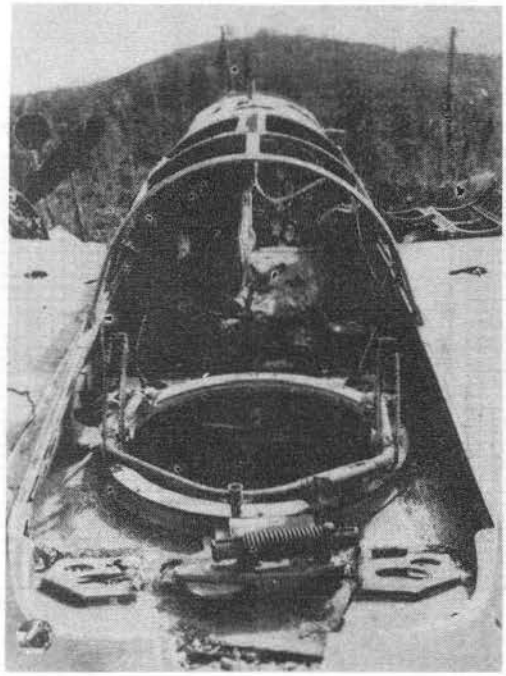
# LILY 2

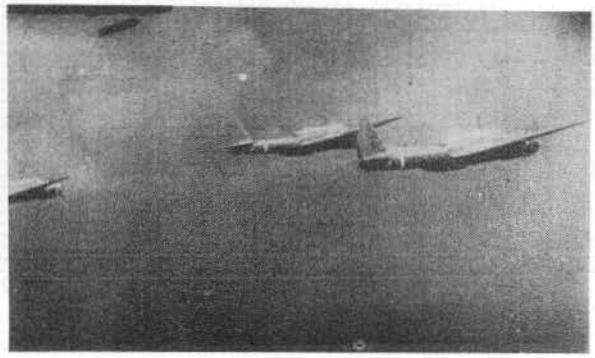




**RESTRICTED**

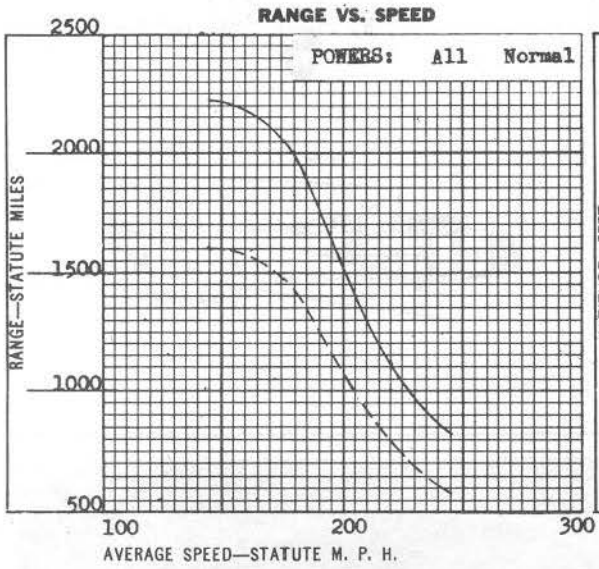
**DATE** December 1944

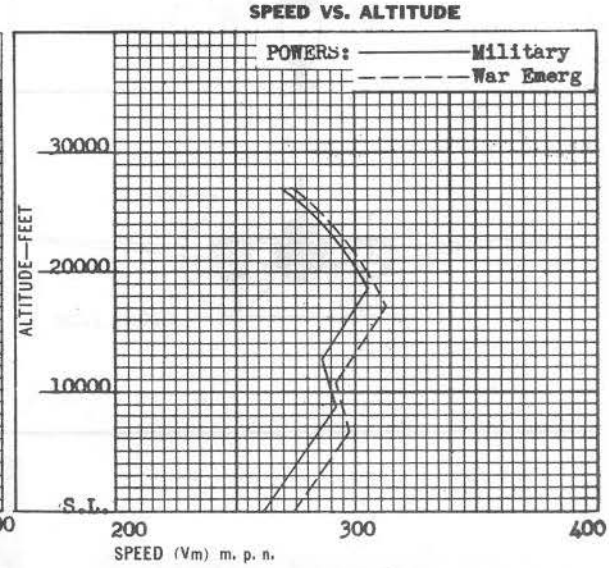
553A-1

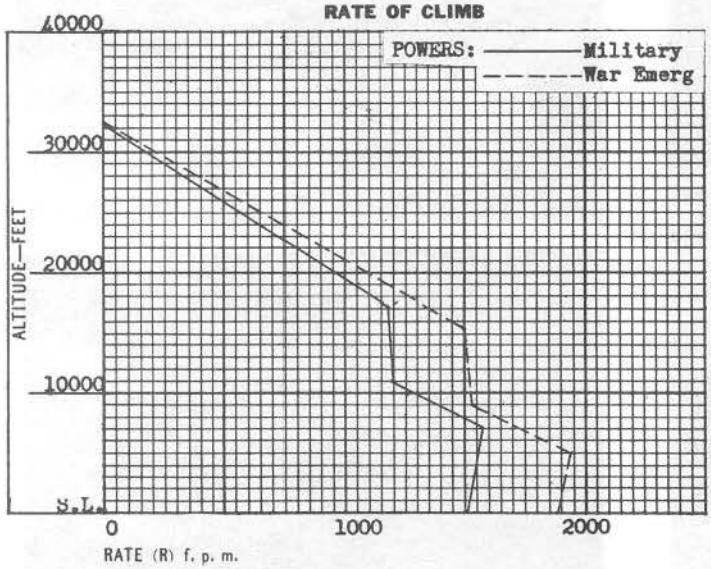
# HELEN 2

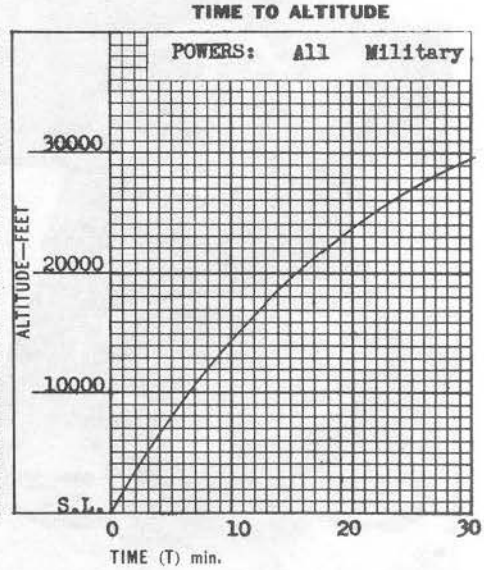
## RANGE * SPEED * CLIMB

| KEY | CONDITION | WEIGHT (lb.) | FUEL LOAD (lb.) | BOMBS—CARGO (lb.) |
|---|---|---|---|---|
| ——— | BOMBER OVERLOAD (Max Fuel) | 24400 | 5544 | 1654 |
| - - - - - - - - - - | NORMAL BOMBER | 23523 | 3962 | 2205 |




**DATE** December 1944

**RESTRICTED**

# PERFORMANCE AND CHARACTERISTICS

# HELEN 2

## TAKE-OFF

| | Load | Feet |
|---|---|---|
| T.O. calm | 23523 | 881 |
| T.O. 25 kt. wind | 23523 | 432 |
| T.O. over 50' obstacle | | |
| Landing over 50' obstacle | | |

## CLIMB—CEILING

| @ 24,400 lbs. | Feet | Min. |
|---|---|---|
| Rate @ S.L. | 1505 | 1 |
| Rate @ 5,000 ft. | 1580 | 1 |
| Time to 10,000' | | 6.6 |
| Time to 20,000' | | 15.2 |
| Service ceiling 30,930' | | |

## AIRCRAFT

Duty Medium Bomber

Designation Type 100, Model 2

Description Mid-wing Monoplane

Mfg. Nakajima

Engines 2 Crew 7

Construction All metal

## SPEED

| @23523 lbs. | Mph. | Knts. | Altitude |
|---|---|---|---|
| War Emerg. | 274 | 238 | @ S.L. |
| Maximum | 262 | 227 | @ S.L. |
| War Emerg. | 312 | 271 | @ 16,900' |
| Maximum | 305 | 264 | @ 18,700' |
| Cruising 75% | 184 | 159 | 1,500' |
| Economical | | | |

## BOMBS—CARGO

| | No. | Size | Total Lbs. |
|---|---|---|---|
| Normal | 2 | 500 kg. | 2200 |
| or | 4 | 250 kg. | 2200 |
| or | 6 | 100 kg. | 1320 |
| or | 9 | 50 kg. | 990 |
| Maximum | 4 | 250 kg. | 2200 |

## ENGINES

| | H. P. | Altitude |
|---|---|---|
| Take-off | 1500 | S.L. |
| Normal | | |
| Military | 1420 | 7,000' |
| | 1300 | 17,200' |
| War Emerg. | 1570 | 5,000' |

Mfg. Nakajima

Model Type 2, 1450 h.p.

Type Radial

Cylinders 14 Cooling Air

Supercharger 2 Speed

Propeller 3 Blade Diam. 10.8' C.S.

Fuel - Take-off 92 Cruising 92 or 87 plus methanol

## WEIGHTS

| | Lbs. |
|---|---|
| Empty | 14730 |
| Gross | 23523 |
| Overload (Max. Fuel) | 24400 |

## FUEL

| | U.S. gal. | Imp. gal. |
|---|---|---|
| Built-in | 661 | 549 |
| Internal (Removable) | 263 | 218 |
| External (drop) | | |
| Maximum | 924 | 767 |

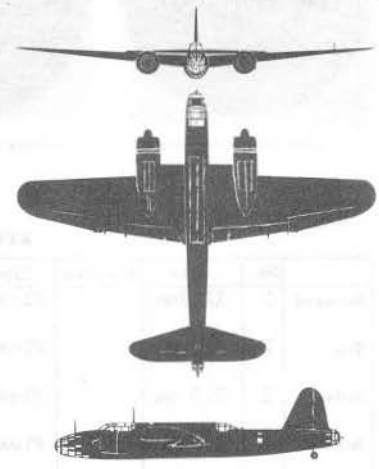
## RANGE AND RADIUS

| | Miles | | Speed | | Alt. | Fuel gal. | | Bombs | Cargo |
|---|---|---|---|---|---|---|---|---|---|
| | stat. | naut. | mph. | Knts. | feet | U. S. | Imp. | lbs. | lbs. |
| Maximum range (maximum fuel) | 2220 | 1928 | 145 | 126 | 1500 | 924 | 767 | 1650 | None |
| At 75% Vmax. | 1915 | 1663 | 184 | 159 | 1500 | 924 | 767 | 1650 | None |
| Maximum range (normal fuel) | 1605 | 1393 | 146 | 127 | 1500 | 661 | 549 | 2200 | None |
| At 75% Vmax. | 1375 | 1194 | 184 | 159 | 1500 | 661 | 549 | 2200 | None |
| Radius ( ) | | | | | | | | | |
| Radius ( ) | | | | | | | | | |

## DIMENSIONS

Span 66.6' Length 54'

Height Wing area 684 sq.ft.



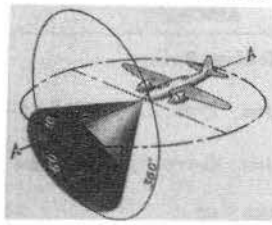
## GENERAL DATA

HELEN uses the same engine as TOJO. At present this plane is one of the most widely used of all Japanese Army bombers.

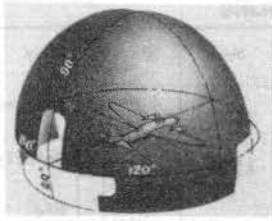
Climb figures are computed with an overload condition.

# HELEN 2

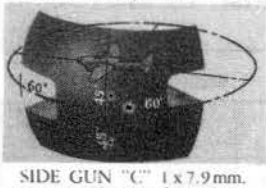
## FIELDS OF FIRE



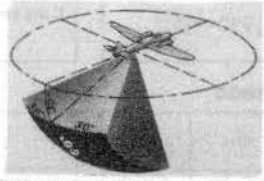
FORWARD GUN "A" 1 x 12.7 mm.
¾-front view from above
Turret can be rotated manually thru 360° about axis "A"-"A"
Alternate nose gun 1 x 7.7 mm.



TOP GUN "B" 1 x 20 mm.
¾-rear view from above



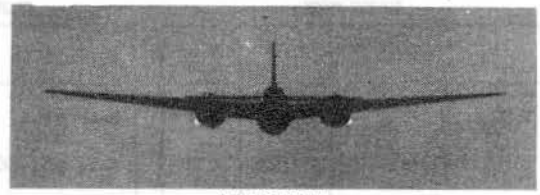
SIDE GUN "C" 1 x 7.9 mm.
Approx. side view from above
Field of fire for SIDE GUN "D" similar



BOTTOM GUN "E" 1 x 7.9 mm.
¾-rear view from above

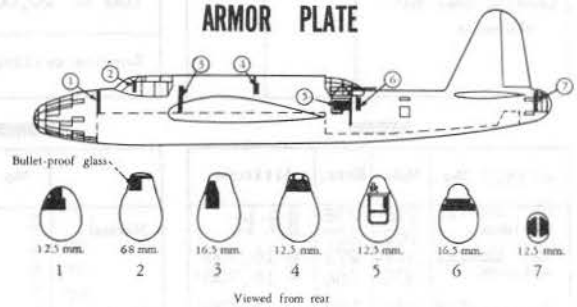
TAIL GUN "F" 1 x 12.7 mm.
¾-rear view from above

## EXHAUST FLAME PATTERNS



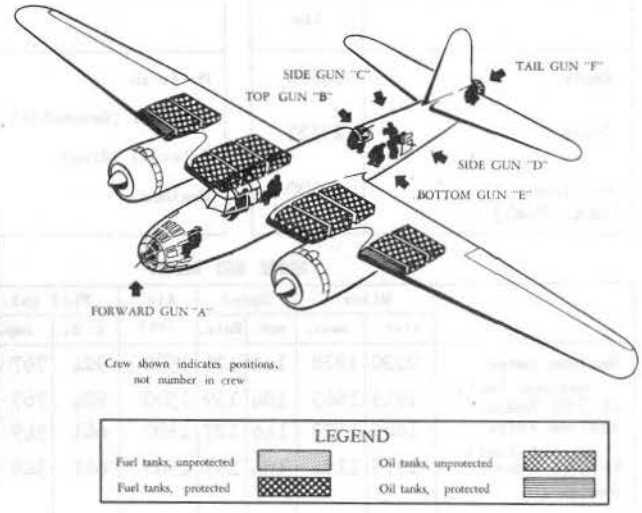
REAR VIEW

## ARMOR PLATE

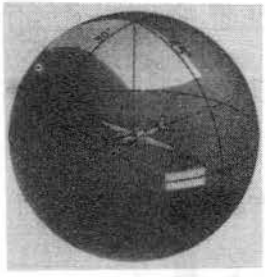



Viewed from rear

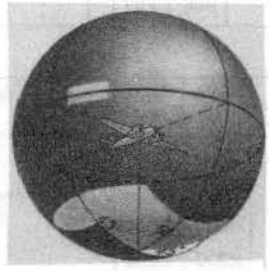
## VULNERABILITY




## FIRE FREE FIELDS



¾-front view from above



¾-front view from below

## ARMAMENT

| | No. | Size | Rds. Gun | Type | | No. | Size | Rds. Gun | Type |
|---|---|---|---|---|---|---|---|---|---|
| Forward | 1 | 12.7mm | | Flex. | Tail | 1 | 12.7 mm | | Flex. |
| Top | 1 | 20 mm | | Flex. | Wing | | | | |
| Side | 2 | 7.9 mm | | Flex. | | | | | |
| Bottom | 1 | 7.9 mm | | Flex. | | | | | |

## TACTICAL DATA

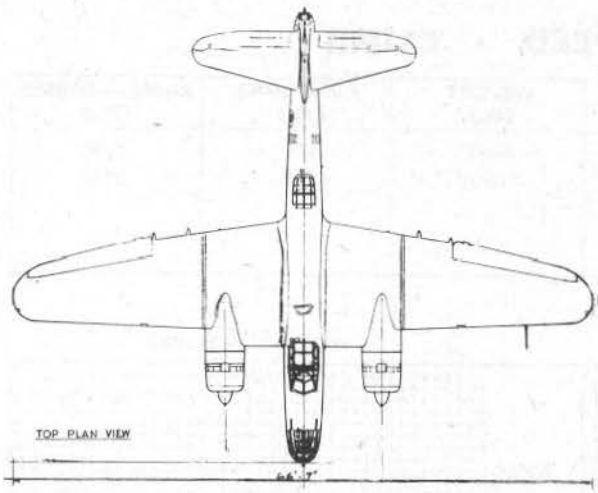
Bullet proof glass and armor plate for the pilot plus armor for the tail gunner and the dorsal turret gunner offer ample protection in HELEN. Fuel tanks are leak-proofed with thin laminated rubber and kapok.

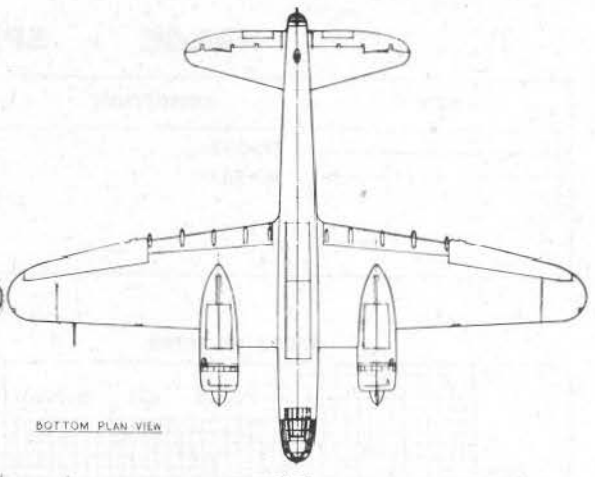
**DATE** December 1944

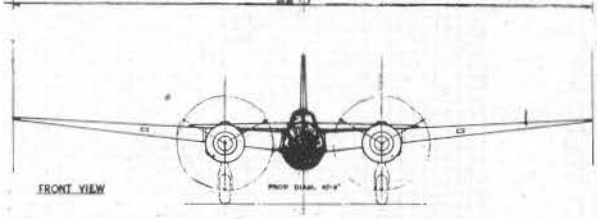
**RESTRICTED**

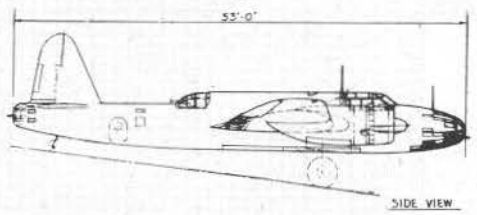
553A-4

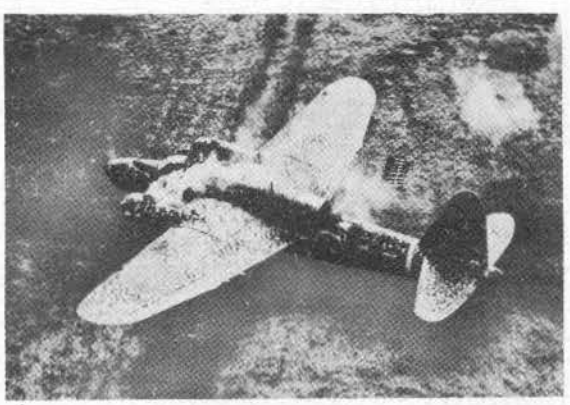
# HELEN 2

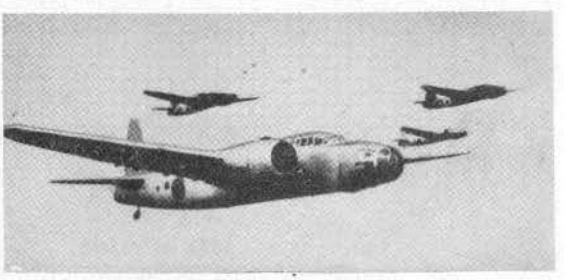


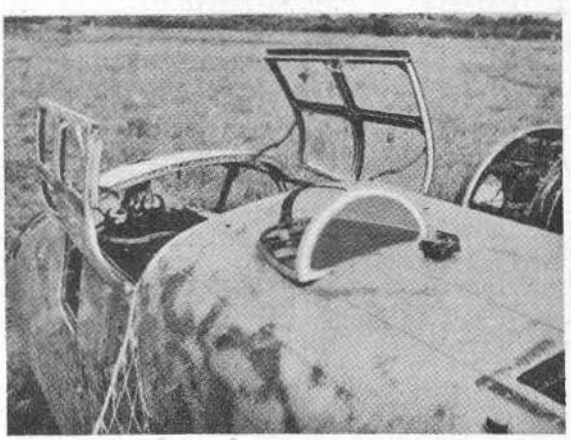







**RESTRICTED**

**DATE** December 1944

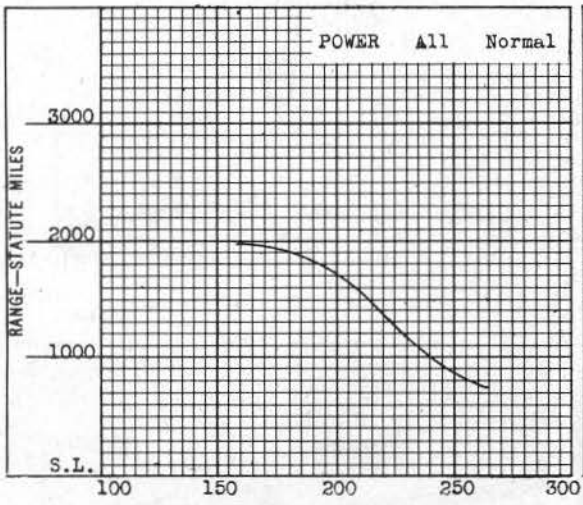
554A-1

# PEGGY

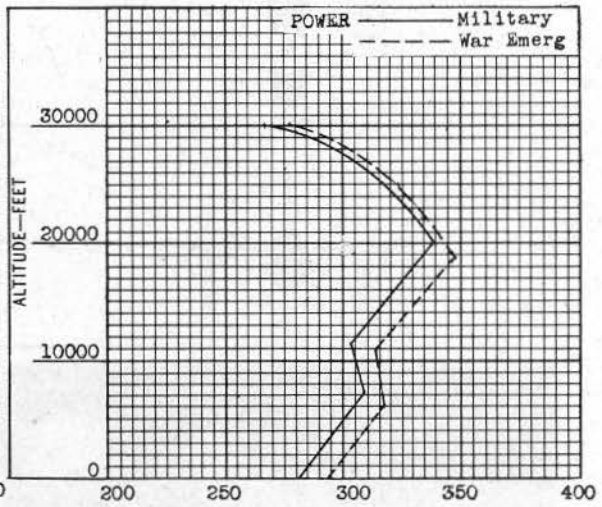
## RANGE * SPEED * CLIMB

| KEY | CONDITION | WEIGHT (lb.) | FUEL LOAD (lb.) | BOMBS—CARGO (lb.) |
|---|---|---|---|---|
| ——— | BOMBER | 30900 | 6150 | 1765 |
| - - - - - - - - - - | BOMBER | 30900 | 6150 | 1765 |

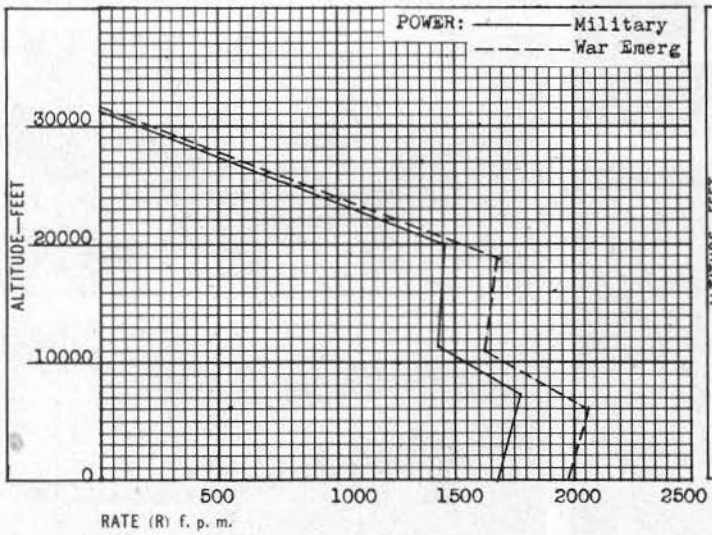
**RANGE VS. SPEED**



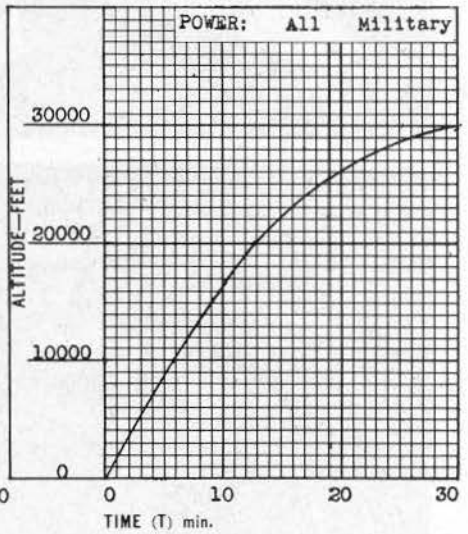

**SPEED VS. ALTITUDE**




**RATE OF CLIMB**




**TIME TO ALTITUDE**




**DATE** March 1945

**RESTRICTED**

# PERFORMANCE AND CHARACTERISTICS

# PEGGY 1

## TAKE-OFF

| | Load | Feet |
|---|---|---|
| **Runway Requirements** | 30900 | 2700 |
| T.O. over 50' obstacle | | |
| Landing over 50' obstacle | | |

## CLIMB—CEILING

| @ 30900 lbs. | Feet | Min. |
|---|---|---|
| Rate @ S.L. | 1680 | 1 |
| Rate @7200 ft. | 1775 | 1 |
| Time to 10,000' | | 5.9 |
| Time to 20,000' | | 12.7 |
| Service ceiling 30,250' | | |

## AIRCRAFT

Duty Bomber

Designation Ki 67

Description Mid-wing Monoplane

Mfg. Mitsubishi

Engines 2 Crew 7

Construction All Metal

## SPEED

| @ 30,900 lbs. | Mph. | Knts. | Altitude |
|---|---|---|---|
| Maximum | 294 | 256 | @ S. L. |
| Maximum @ 75% Vmax | 348 | 302 | @18,700' |
| Cruising | 198 | 171 | 1,500' |
| Economical | | | |

## BOMBS—CARGO

| | No. | Size | Total Lbs. |
|---|---|---|---|
| Normal | | | 1763 |
| Maximum | 2 | 800 kg | 2526 |

## ENGINES

| | H. P. | Altitude |
|---|---|---|
| Take-off | 1890 | S.L. |
| Normal | 1450 | 10,400' |
| Military | 1775 | 7,200' |
| War Emerg. | 1985 | 6,000' |

Mfg. Mitsubishi

Model Ha 42 Model 11 (Ha 104)

Type Radial

Cylinders 18 Cooling Air Fan assisted

Supercharger 2 Speed

Propeller 4-Blade Diam. 11.8' electric VDM

Fuel - Take-off 92 Cruising 92

## WEIGHTS

| | Lbs. |
|---|---|
| Empty | |
| Gross | 30900 |
| Overload | |

## FUEL

| | U.S. gal. | Imp. gal. |
|---|---|---|
| Built-in | 1025 | 852 |
| Internal (Removable) | | |
| External (drop) | | |
| Maximum | 1025 | 852 |

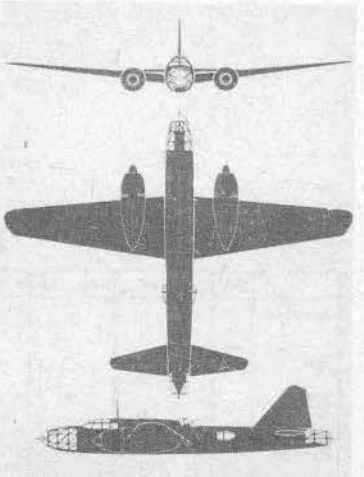
## RANGE AND RADIUS

| | Miles | | Speed | | Alt. feet | Fuel gal. | | Bombs lbs. | Cargo lbs. |
|---|---|---|---|---|---|---|---|---|---|
| | stat. | naut. | mph. | Knts. | | U. S. | Imp. | | |
| Maximum range (maximum fuel) | 1985 | 1720 | 159 | 138 | 1500 | 1025 | 852 | 1763 | |
| Maximum range (normal fuel) | 1735 | 1510 | 198 | 171 | 1500 | 1025 | 852 | 1763 | |
| Radius ( ) | | | | | | | | | |
| Radius ( ) | | | | | | | | | |

## DIMENSIONS

Span 73.8' Length 61.4'

Height 18.4' Wing area 709 sq.ft.



## GENERAL DATA

All fuel tanks are protected with 3-ply rubber 5/8" thick. Pilot and Co-Pilot are protected by back and head armor 5/8" thick.

This is an Army bomber which may be converted for torpedo bombing. For further information on this plane see TAIC Summary No. 26.

**RESTRICTED**

**DATE** March 1945

636986 O - 45 - 5

554A-3

# PEGGY 1

Vulnerability, Fields of Fire, etc.

**ARMAMENT**

| | No. | Size | Rds. Gun | Type | | No. | Size | Rds. Gun | Type |
|---|---|---|---|---|---|---|---|---|---|
| Forward | | | | | Tail | | | | |
| Top | | | | | Wing | | | | |
| Side | | | | | | | | | |
| Bottom | | | | | | | | | |

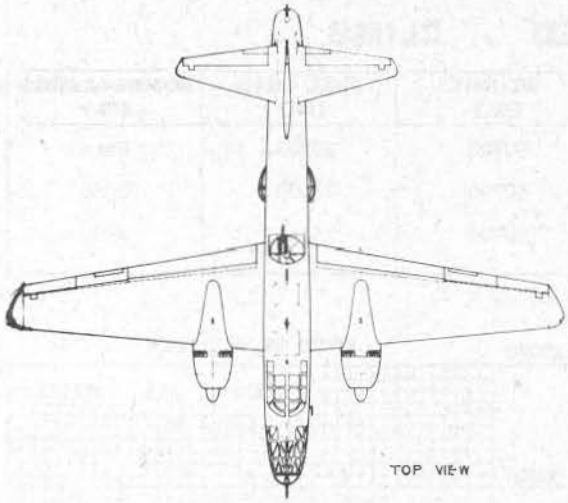
**TACTICAL DATA**

**DATE** March 1945

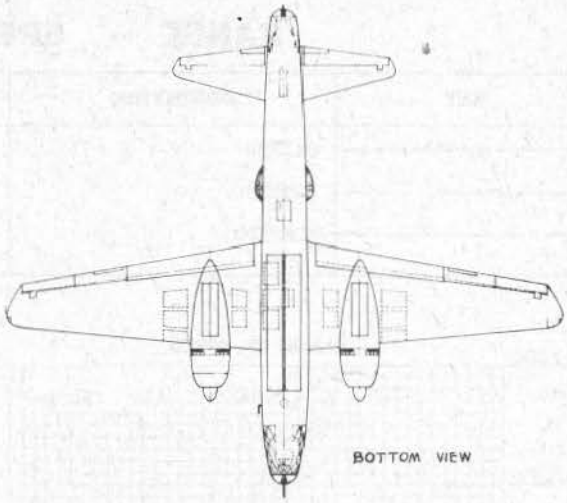
**RESTRICTED**

554A-4

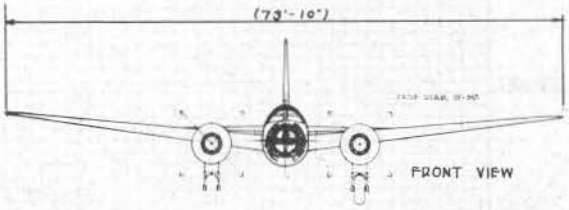
# PEGGY 1



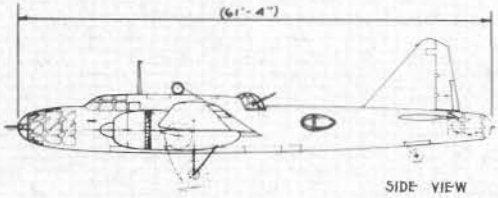
TOP VIEW



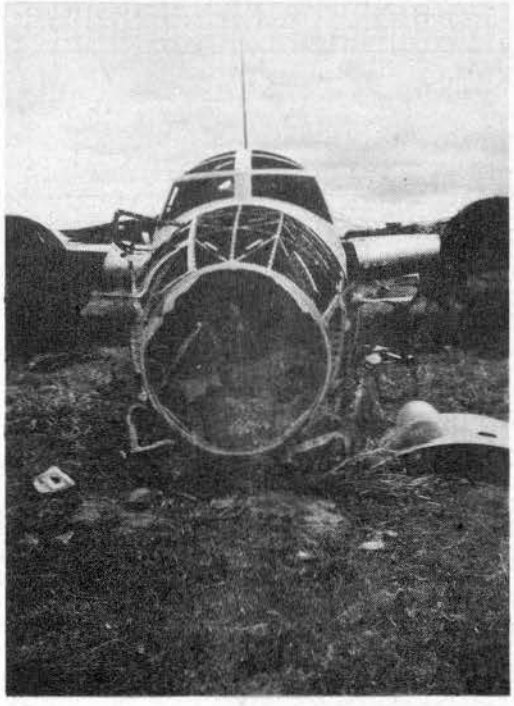
BOTTOM VIEW

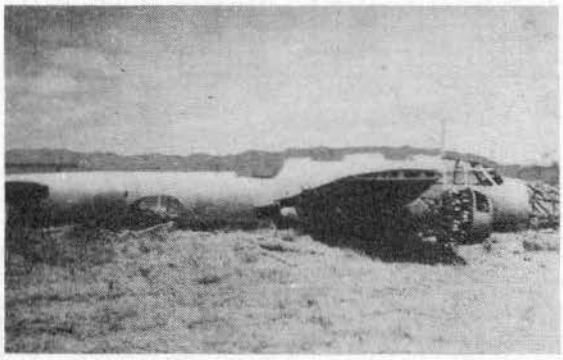



FRONT VIEW




SIDE VIEW





**RESTRICTED**

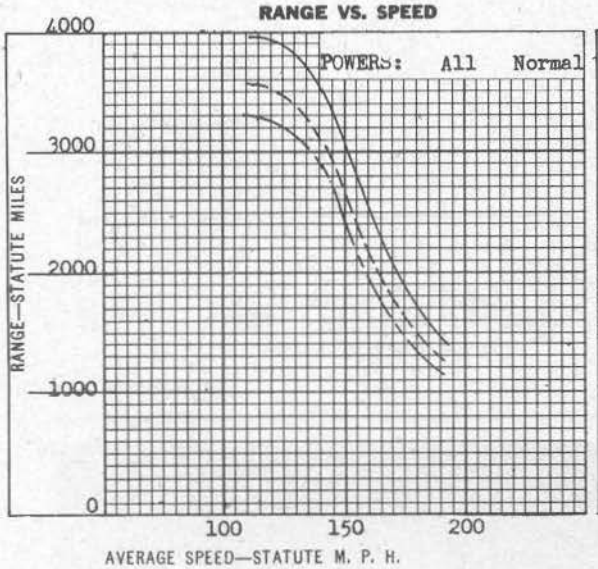
**DATE** March 1945

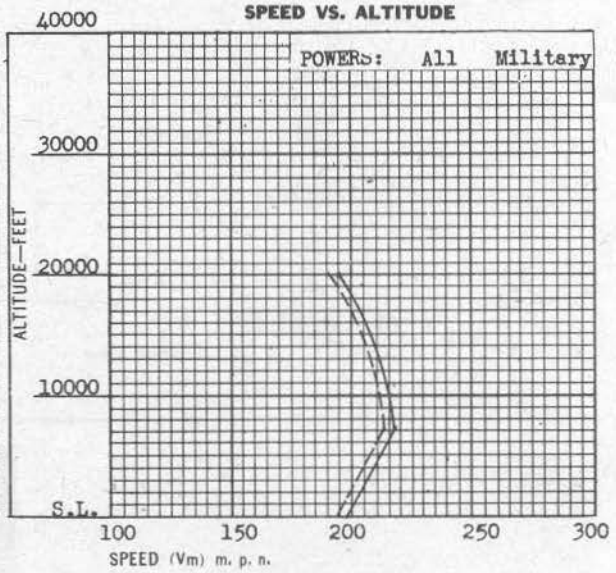
601A-1

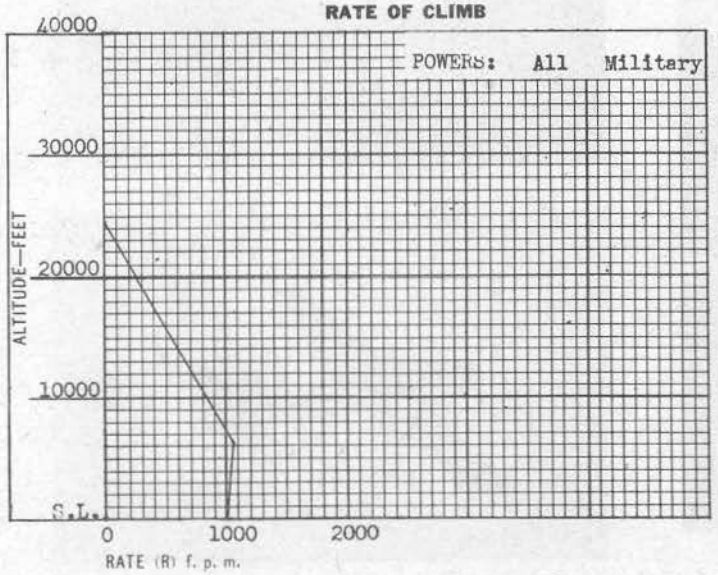
# MAVIS 22

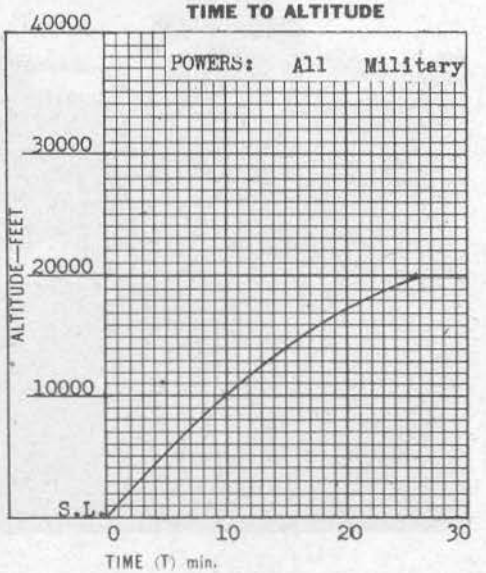
## RANGE * SPEED * CLIMB

| KEY | CONDITION | WEIGHT (lb.) | FUEL LOAD (lb.) | BOMBS—CARGO (lb.) |
|---|---|---|---|---|
| ——— | PATROL | 50700 | 20000 | None |
| – – – – – – – – – – | BOMBER | 50700 | 18600 | 1586 |
| ——— – – ——— – | TORPEDO | 50700 | 16460 | 3530 |




**DATE** December 1944

**RESTRICTED**

# PERFORMANCE AND CHARACTERISTICS

# MAVIS 22

## TAKE-OFF

| | Load | Feet |
|---|---|---|
| T.O. calm | | |
| T.O. 25 kt. wind | | |
| T.O. over 50' obstacle | | |
| Landing over 50' obstacle | | |

## CLIMB—CEILING

| @ 50,700 lbs. | Feet | Min. |
|---|---|---|
| Rate @ S.L. | 1004 | 1 |
| Rate @ 6,200 ft. | 1063 | 1 |
| Time to 10,000' | | 9.9 |
| Time to 20,000' | | 25.8 |
| Service ceiling 24,680' | | |

## AIRCRAFT

Duty Patrol Transport

Designation Type 97, Model 11

Description High Parasol Wing Flying Boat

Mfg. Kawanishi

Engines 4 Crew 8-10

Construction Metal

## SPEED

| @ 50700 lbs. | Mph. | Knts. | Altitude |
|---|---|---|---|
| Maximum | 198 | 171 | @ S. L. |
| Maximum | 217 | 188 | @6,200' |
| Cruising 75% | 145 | 126 | 1,500' |
| Economical | | | |

## BOMBS—CARGO

| | No. | Size | Total Lbs. |
|---|---|---|---|
| Normal | 2 | 800 kg | 3520 |
| or | 12 | 60 kg | 1584 |
| Maximum | 2 | 800 kg (Torps) | 3520 |

## ENGINES

| | H. P. | Altitude |
|---|---|---|
| Take-off | 1030 | S.L. |
| Normal | 840<br>910 | S.L.<br>8,200' |
| Military | 990<br>1050 | S.L.<br>6,200' |
| War Emerg. | | |

Mfg. Mitsubishi

Model Kinsei 43

Type Radial

Cylinders 14 Cooling Air

Supercharger Single speed

Propeller 3 Blade Diam. 10.5' C.S.

Fuel - Take-off 92 Cruising 92

## WEIGHTS

| | Lbs. |
|---|---|
| Empty | 25,600 |
| Gross | 50,700 |
| Overload | |

## FUEL

| | U.S. gal. | Imp. gal. |
|---|---|---|
| Built-in | 3330 | 2764 |
| Internal (Removable) | | |
| External (drop) | | |
| Maximum | 3330 | 2764 |

## RANGE AND RADIUS

| | Miles | | Speed | | Alt. feet | Fuel gal. | | Bombs lbs. | Cargo lbs. |
|---|---|---|---|---|---|---|---|---|---|
| | stat. | naut. | mph. | Knts. | | U. S. | Imp. | | |
| Maximum range (maximum fuel) | 3980 | 3460 | 112 | 97 | 1500 | 3330 | 2764 | None | None |
| At 75% Vmax. | 3350 | 2909 | 145 | 126 | 1500 | 3330 | 2764 | None | None |
| Maximum range (normal fuel) | 3300 | 2866 | 109 | 94 | 1500 | 2745 | 2764 | 3520 | None |
| At 75% Vmax. | 2740 | 2375 | 144 | 124 | 1500 | 2745 | 2764 | 3520 | None |
| Radius ( ) | | | | | | | | | |
| Radius ( ) | | | | | | | | | |

## DIMENSIONS

Span 131.3' Length 82'

Height 20.5' Wing area 1830 sq.ft.

## GENERAL DATA

MAVIS is rapidly becomming obsolete as an operational military aircraft. Figures shown for "Maximum Range (Normal Fuel)" are given as an example of the range and load carrying ability - cargo could easily be substituted for bomb figures.

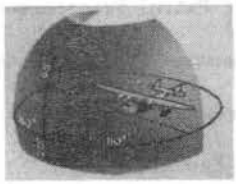
MAVIS has now largely been replaced by EMILY except for rear area transport purposes.

Radar has been indicated on the few MAVIS 22's seen in the combat areas.

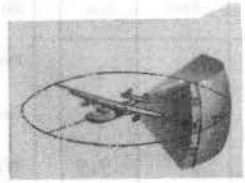
601A-3

# MAVIS 22

## FIELDS OF FIRE

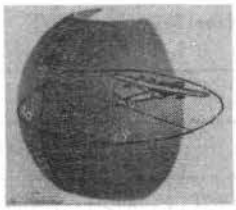


TOP FORWARD GUN "A" 1 x 7.7 mm; ¾-front view from above

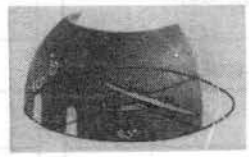


SIDE GUN "C" 1 x 20 mm. ¾-front view from above

Field of fire for SIDE GUN "D" similar

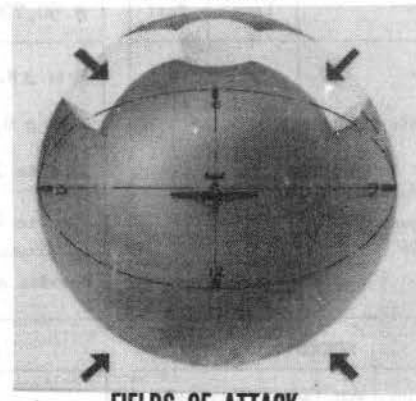


TAIL GUN "E" 1 x 20 mm. ¾-rear view from above



TOP REAR GUN "B" 1 x 7.7 mm. ¾-rear view from above

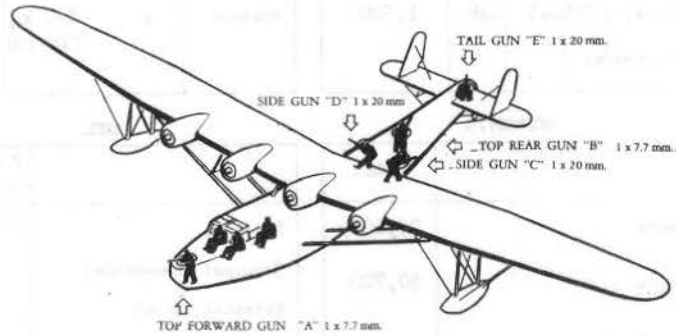
## VULNERABILITY



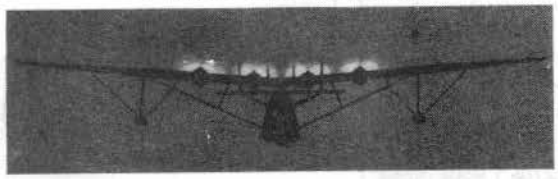
## FIELDS OF ATTACK

5, AND, 9 O'CLOCK FROM ABOVE AND BELOW.

This page is in process of revision and will be reissued on completion.




## EXHAUST FLAME PATTERNS



REAR VIEW

Location of oxygen cylinders unknown
Location of Oil and Gas tanks not known.

## ARMAMENT

| | No. | Size | Rds. Gun | Type | | No. | Size | Rds. Gun | Type |
|---|---|---|---|---|---|---|---|---|---|
| Forward | 1 | 7.7 mm | | Flex. | Tail | 1 | 20 mm | | Flex. |
| Top | 1 | 7.7 mm | | Flex. | Wing | | | | |
| or | 1 | 20 mm | | Flex. | | | | | |
| Side | 2 | 20 mm | | Flex. | | | | | |
| Bottom | | | | | | | | | |

## TACTICAL DATA

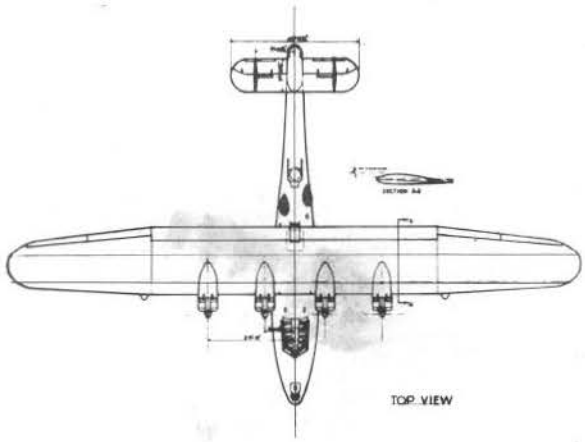
Armor has never been identified with MAVIS.

Fuel cells are not leak-proofed.

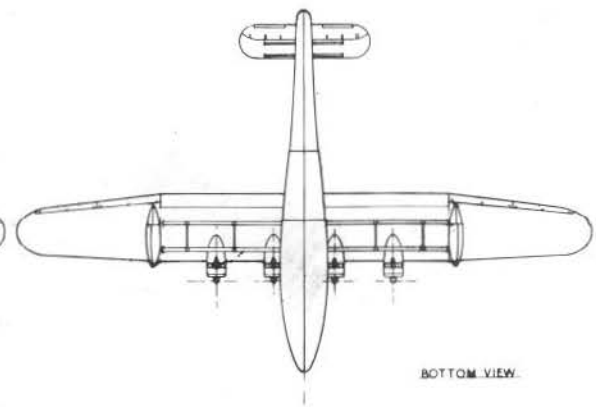
**DATE** December 1944

**RESTRICTED**

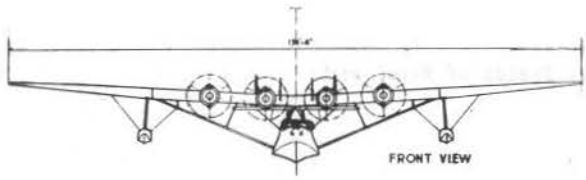
# MAVIS 22



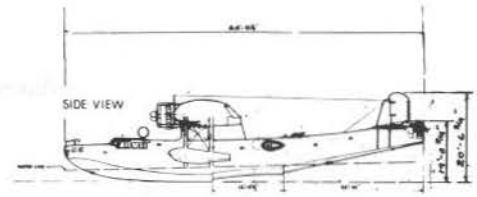
TOP VIEW



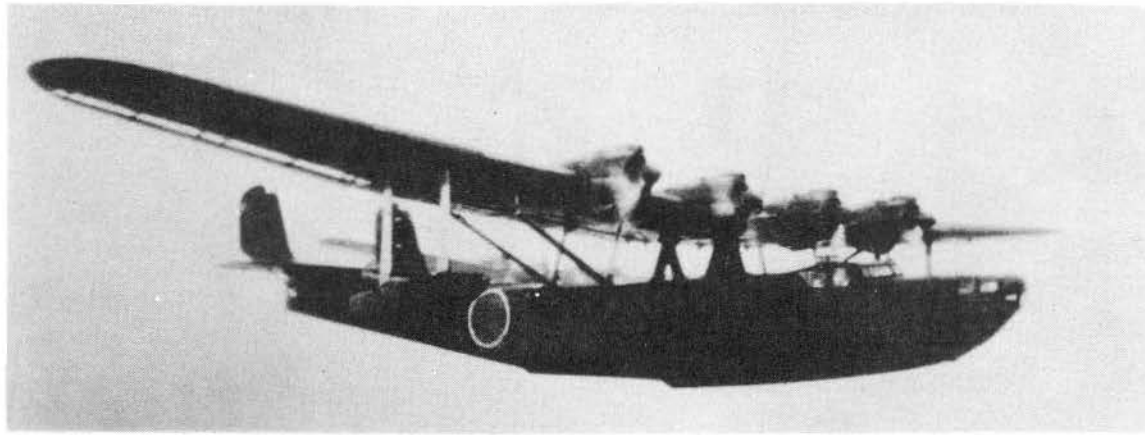
BOTTOM VIEW

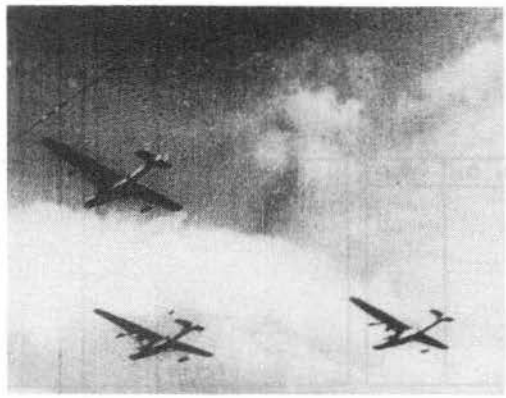


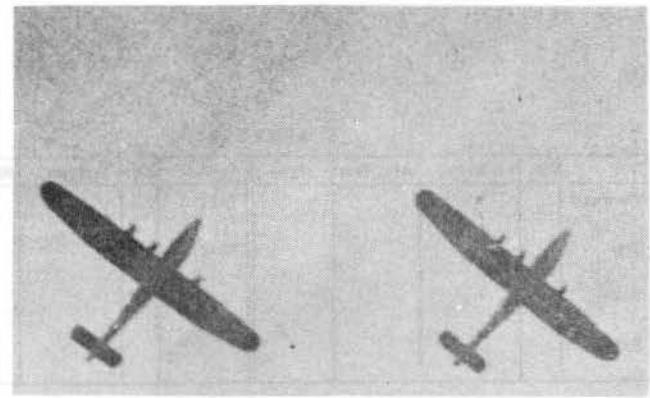
FRONT VIEW



SIDE VIEW







**RESTRICTED**

**DATE** December 1944

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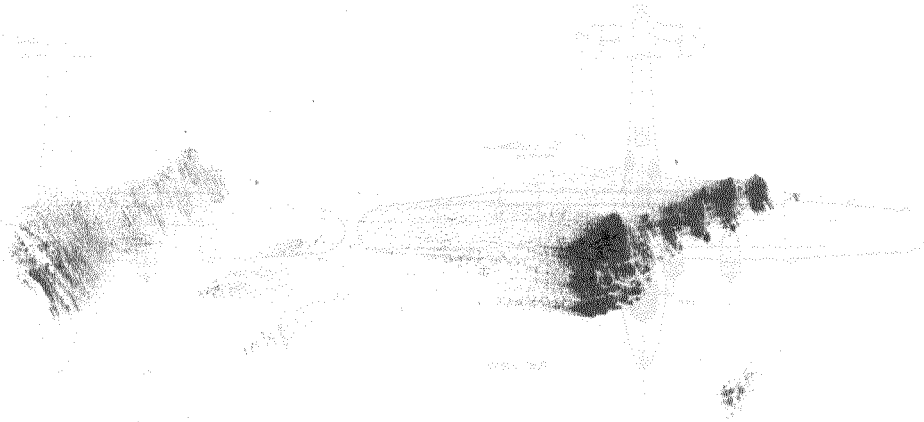
# CHERRY 11



Vulnerability, Fields of Fire, etc.

**ARMAMENT**

| | No. | Size | Rds. Gun | Type | | No. | Size | Rds. Gun | Type |
|---|---|---|---|---|---|---|---|---|---|
| Forward | | | | | Tail | | | | |
| Top | | | | | Wing | | | | |
| Side | | | | | | | | | |
| Bottom | | | | | | | | | |

**TACTICAL DATA**

No information.

**DATE** December 1944

**RESTRICTED**

# PERFORMANCE AND CHARACTERISTICS

# CHERRY 11

**TAKE-OFF**

| | Load | Feet |
|---|---|---|
| T.O. calm | | |
| T.O. 25 kt. wind | | |
| T.O. over 50' obstacle | | |
| Landing over 50' obstacle | | |

**CLIMB—CEILING**

| @ lbs. | Feet | Min. |
|---|---|---|
| Rate @ S.L. | | |
| Rate @ ft. | | |
| Time to | | |
| Time to | | |
| Service ceiling | | |

**AIRCRAFT**

| | |
|---|---|
| Duty | Flying Boat |
| Designation | Type 99, Model 11 |
| Description | High-wing Monoplane |
| Mfg. | Kawanishi |
| Engines | 2 Crew |
| Construction | |

**SPEED**

| @ lbs. | Mph. | Knts. | Altitude |
|---|---|---|---|
| Maximum | | | @ S. L. |
| Maximum | | | @ |
| Cruising | | | |
| Economical | | | |

**BOMBS—CARGO**

| | No. | Size | Total Lbs. |
|---|---|---|---|
| Normal | | | |
| Maximum | | | |

**ENGINES**

| | H. P. | Altitude |
|---|---|---|
| Take-off | | |
| Normal | | |
| Military | | |
| War Emerg. | | |

| | |
|---|---|
| Mfg. | |
| Model | |
| Type | |
| Cylinders | Cooling |
| Supercharger | |
| Propeller | Diam. |
| Fuel - Take-off | Cruising |

**WEIGHTS**

| | Lbs. |
|---|---|
| Empty | |
| Gross | |
| Overload | |

**FUEL**

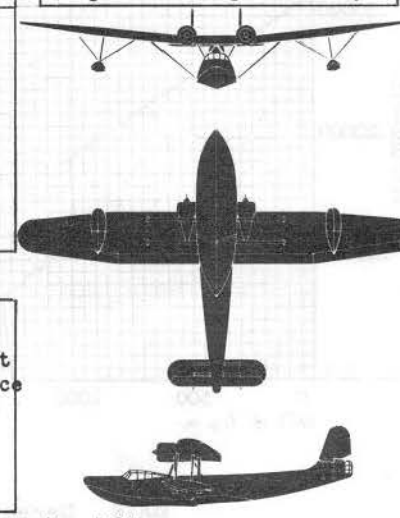
| | U.S. gal. | Imp. gal. |
|---|---|---|
| Built-in | | |
| Internal (Removable) | | |
| External (drop) | | |
| Maximum | | |

**RANGE AND RADIUS**

| | Miles | | Speed | | Alt. feet | Fuel gal. | | Bombs lbs. | Cargo lbs. |
|---|---|---|---|---|---|---|---|---|---|
| | stat. | naut. | mph. | Knts. | | U. S. | Imp. | | |
| Maximum range (maximum fuel) | | | | | | | | | |
| Maximum range (normal fuel) | | | | | | | | | |
| Radius ( ) | | | | | | | | | |
| Radius ( ) | | | | | | | | | |

**DIMENSIONS**

Span Length
Height Wing area sq.ft.



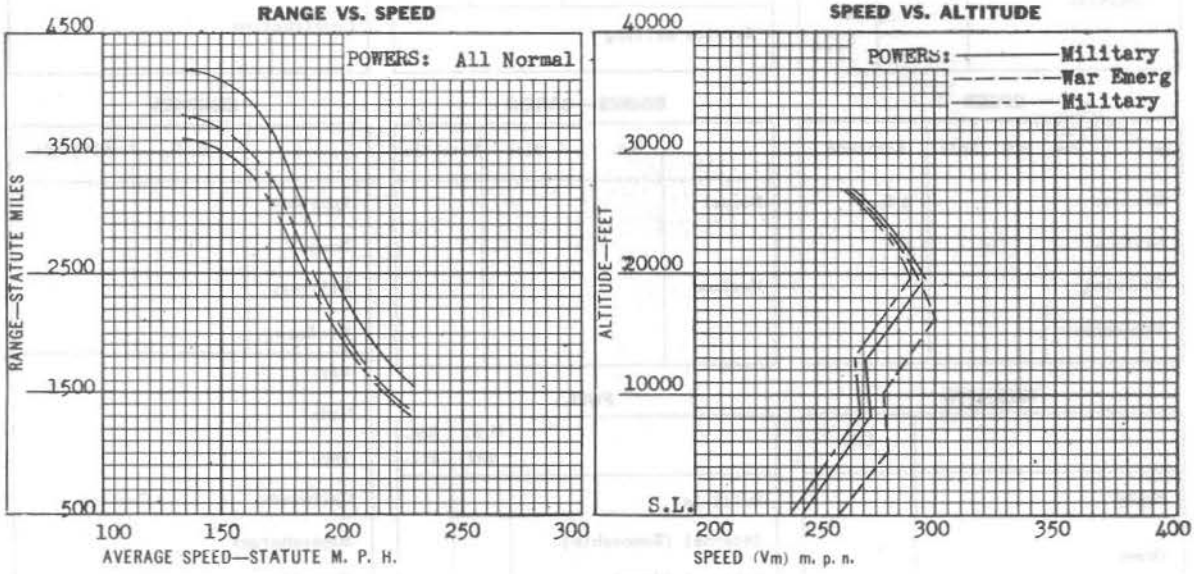
**GENERAL DATA**

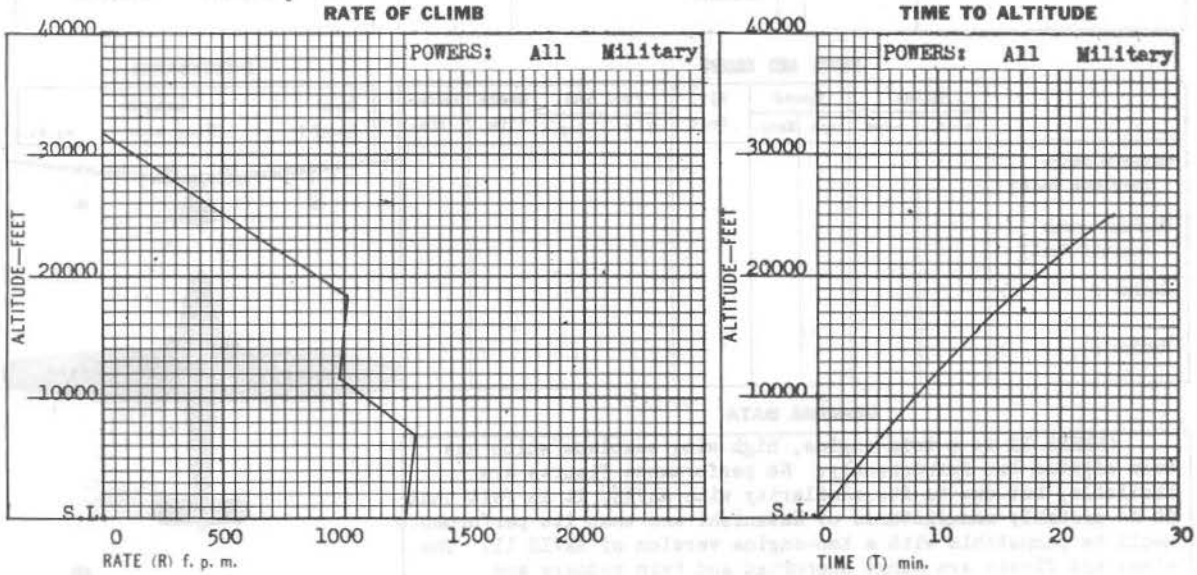
CHERRY 11 is a twin-engine, high wing seaplane which has been sighted but infrequently. No performance figures are available, but due to its similarity with MAVIS, it is felt that it is probably manufactured by Kawanishi and that its performance would be compatible with a two-engine version of MAVIS 11. The wings and floats are strut supported and twin rudders are mounted on a high tail plane.

# EMILY 22

## RANGE * SPEED * CLIMB

| KEY | CONDITION | WEIGHT (lb.) | FUEL LOAD (lb.) | BOMBS—CARGO (lb.) |
|---|---|---|---|---|
| ——— | PATROL (OVERLOAD) | 68342 | 26400 | None |
| - - - - - - - - - - - - | PATROL (OVERLOAD) | 68342 | 26400 | None |
| ——— — ——— | TORPEDO (OVERLOAD) | 68342 | 22430 | 3530 |
| ——— ——— ——— | BOMBER (OVERLOAD) | 68342 | 22300 | 2120 |




**DATE** December 1944

**RESTRICTED**

# PERFORMANCE AND CHARACTERISTICS

# EMILY 22

## TAKE-OFF

| | Load | Feet |
|---|---|---|
| T.O. calm | | |
| T.O. 25 kt. wind | | |
| T.O. over 50' obstacle | | |
| Landing over 50' obstacle | | |

## CLIMB—CEILING

| @ 68,342 lbs. | Feet | Min. |
|---|---|---|
| Rate @ S.L. | 1250 | 1 |
| Rate @18,300 ft. | 1010 | 1 |
| Time to 10,000' | | 8.1 |
| Time to 20,000' | | 18.0 |
| Service ceiling 30,500' | | |

## AIRCRAFT

Duty Patrol Bomber

Designation Type 2, Model 12

Description High-wing Flying Boat

Mfg. Kawanishi

Engines 4 Crew 9

Construction All metal

## SPEED

| @68,342lbs. | Mph. | Knts. | Altitude |
|---|---|---|---|
| Maximum | 245 | 213 | @ S.L. |
| Maximum | 263 | 228 | @ 8,000' |
| Maximum | 296 | 257 | @ 19,500' |
| Cruising75% | 172 | 149 | 1,500' |
| Economical | | | |

## BOMBS—CARGO

| | No. | Size | Total Lbs. |
|---|---|---|---|
| Normal | 2 | 800 kg. (Torp) | 1760 |
| or | 2 | 800 kg. (Bombs) | 1760 |
| or | 8 | 250 kg. | 4400 |
| or | 16 | 60 kg. | 2213 |
| Maximum | | | 4400 |

## ENGINES

| | H. P. | Altitude |
|---|---|---|
| Take-off | 1825 | S.L. |
| Normal | 1180<br>1350 | S.L.<br>10,000' |
| Military | 1655 | 6,900' |
| War Emerg. | 1880 | 4,400' |

Mfg. Mitsubishi

Model Kasei 22

Type Radial

Cylinders 14 Cooling Air

Supercharger 2 Speed

Propeller 4 Blade Diam. 12.75' C.S. Laminar Flow Tip

Fuel - Take-off 92 Cruising 92 plus methanol

## WEIGHTS

| | Lbs. |
|---|---|
| Empty | 34,176 |
| Gross | 68,342 |
| Overload | |

## FUEL

| | U.S. gal. | Imp. gal. |
|---|---|---|
| Built-in | 4400 | 3652 |
| Internal (Removable) | | |
| External (drop) | | |
| Maximum | 4400 | 3652 |

## RANGE AND RADIUS

| | Miles | | Speed | | Alt. feet | Fuel gal. | | Bombs lbs. | Cargo lbs. |
|---|---|---|---|---|---|---|---|---|---|
| | stat. | naut. | mph. | Knts. | | U. S. | Imp. | | |
| Maximum range (maximum fuel) | 4190 | 3635 | 138 | 119 | 1500 | 4400 | 3652 | None | None |
| At 75% Vmax. | 3630 | 3150 | 172 | 149 | 1500 | 4400 | 3652 | None | None |
| Maximum range (normal fuel) | 3810 | 3310 | 134 | 116 | 1500 | 3739 | 3103 | 2120 | None |
| At 75% Vmax. | 3251 | 2823 | 171 | 148 | 1500 | 3739 | 3103 | 2120 | None |
| Radius ( ) | | | | | | | | | |
| Radius ( ) | | | | | | | | | |

## DIMENSIONS

Span 124.6' Length 92.3'

Height 30.2' Wing area 1722 sq.ft.

## GENERAL DATA

EMILY has the best protected fuel system, and is the most heavily armored of any Jap aircraft. Long range with remarkable speed make this an excellent Patrol-Bomber.

Range is calculated allowing for dropping the bombs at mid-distance of range. All bombs and torpedoes are carried externally.

EMILY 22 is believed to have substantially the same performance as EMILY 12.

# EMILY 22

## FIELDS OF FIRE

FORWARD GUN "A"
1 x 20 mm.
¾-front view from above
2 x 7.7 mm. Auxiliary

SIDE GUNS "B" AND "C"
1 x 20 mm.
¾-front view from above
2 x 7.7 mm. Auxiliary

TOP GUN "D"
1 x 20 mm.
¾-front view from above

TAIL GUN "E"
1 x 20 mm.
¾-rear view from above

## VULNERABILITY

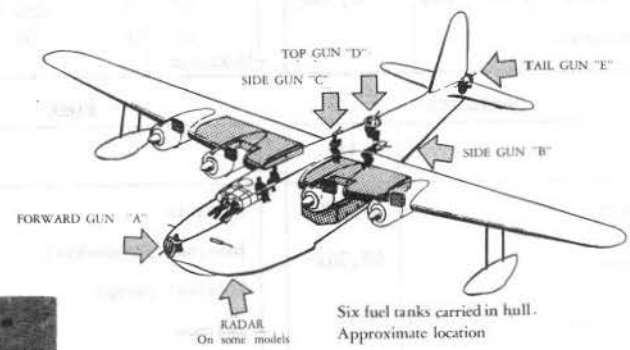
NOTE
Location of fuel and oil tanks shown is approximate
Fuel tanks may be protected.

¼" Armor Plate behind Pilot and Copilot

¼" Armor Plate aft of top turret extending to each side of fuselage

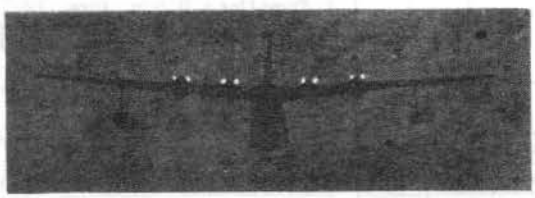
¼" Armor Plate inside of top turret beside gun slot 16" x 16" curved to fit turret

This page is in process of revision and will be released on completion.

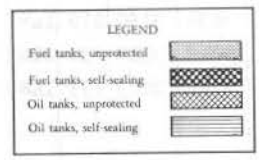



Six fuel tanks carried in hull.
Approximate location

## EXHAUST FLAME PATTERNS



REAR VIEW




## ARMAMENT

| | No. | Size | Rds. Gun | Type | | No. | Size | Rds. Gun | Type |
|---|---|---|---|---|---|---|---|---|---|
| Forward | 1 | 20 mm | | Turret | Tail | 1 | 20 mm | | Flex. |
| | 2 | 7.7mm | | Aux. | | | | | |
| Top | | | | | Wing | | | | |
| Dorsal | 1 | 20 mm | | Turret | | | | | |
| Side | 2 | 20 mm | | Flex. | | | | | |
| | 2 | 7.7mm | | Aux. | | | | | |
| Bottom | | | | | | | | | |

## TACTICAL DATA

EMILY is equipped with radar and is principally used as a long range search or transport plane.

Installation of leak-proof fuel tanks reputedly bullet-proof increases weight 1980 lbs. Improved fire-fighting equipment in fuel tanks.

**DATE** December 1944

**RESTRICTED**

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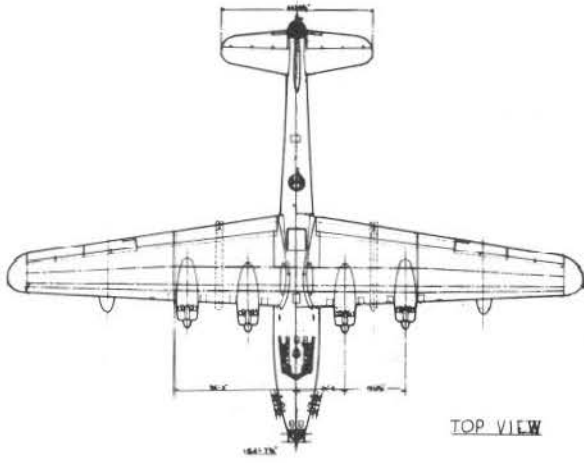
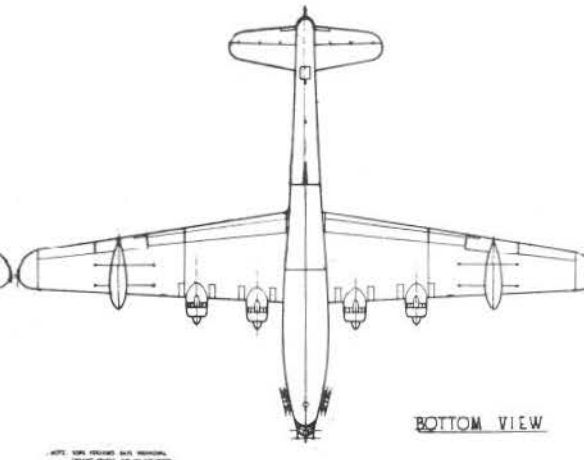
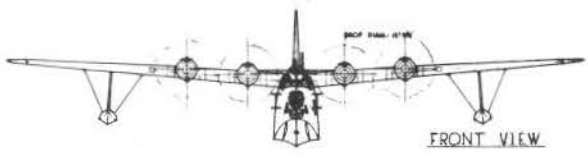
# EMILY 22



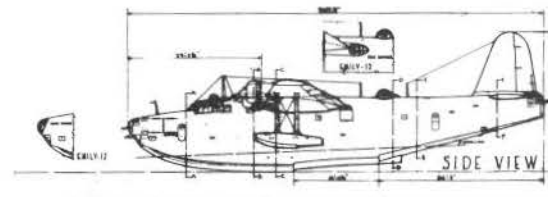
TOP VIEW



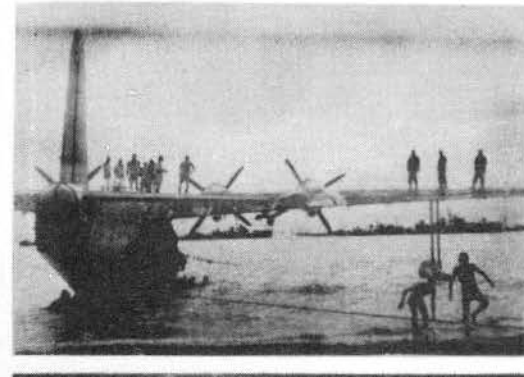
BOTTOM VIEW

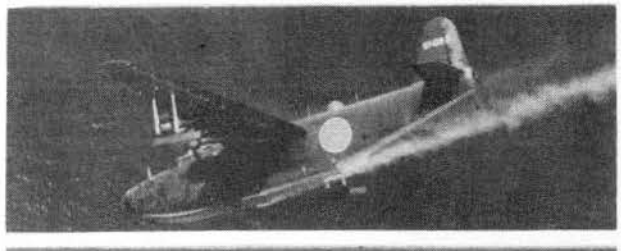


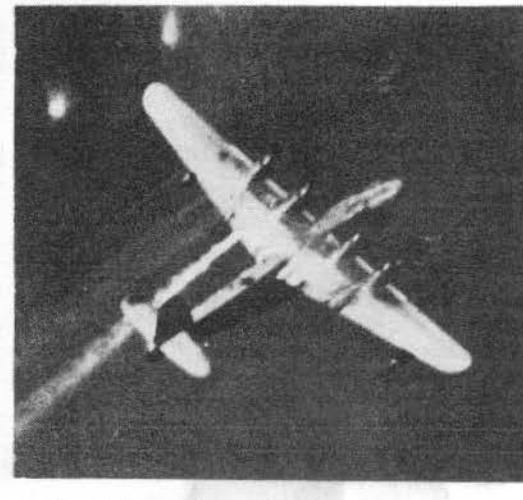
FRONT VIEW



SIDE VIEW







**RESTRICTED**

**DATE** December 1944

NOTES

# ENGINES

GENERAL

This section includes the principal characteristics and performance of engines of the following status:

A. Operational (major operational in forward areas).
B. Obsolescent (minor operational in forward areas).
C. The principal engines known or believed to be close to production or in production and expected to appear in the near future.

DEFINITIONS AND NOMENCLATURE

(1) Model - This is the operational designation which is assigned, usually, when the engine is accepted by the J.A.F. and has reached production status.

(2) Other designations - The designation given as a "Ha" number followed by a "Model" number is the jointly adopted Army-Navy abbreviated designation which is intended by the Japanese for use in communications, sketches, etc.

(3) The Ha number in parenthesis ( ) is the original experimental designation. In the cases where an abbreviated designation is assigned it will probably supersede the latter for purposes of Japanese communications.

It will be noted that certain engines (as an example, see Type 99 950 hp and Sakae Model 12) are given the same abbreviated designation but their operational designations differ. These engines actually differ slightly both in structure and performance. Another example of assignment of the same abbreviated designation to structurally slightly different engines is the Homare - Ha 45 series. It is apparent, therefore, that the abbreviated designation alone does not in all cases fully identify an engine, whereas the operational designation does fully identify it. In communications to TAIC, the operational designations, if known, should always be used, followed by the abbreviated designation if any ambiguity might result by the omission of the latter. In such cases where the operational designation is not known, the abbreviated designation must, of course, be used.

Relative importance of the various designations where all the designations are known is in the descending order discussed in (1), (2) and (3) above.

PERFORMANCE

All ratings tabulated are taken from documents unless followed by asterisk (*). The latter are TAIC estimates.

Take-off - This is usually a one minute rating.

W.E.P. - (War Emergency Power) - These ratings are in most cases estimated extrapolations based on take-off boost pressure. For most engines, documents indicate that take-off boost is permissible for one minute for either take-off or emergency. If one minute is permissible for take-off it is quite probable that under certain flight conditions, this period could be exceeded. Its exact duration is conjectural, but until better information is available, should, to be conservative from a tactical point of view, be considered as at least a five minute rating.

Military - Power available for 30 minutes.

CHARACTERISTICS

BBL - Barrel
UD - Up draft
DD - Down draft
A.D.I. - Anti-detonant injection.
Carb. - Carburetor
Inj. - Injection
Imp. - Impeller
Dry wt. - This is without starter and accessories.
* - A single asterisk, throughout the data sheets indicates an estimate.
HIRO - 11th Air Arsenal
(?) - Questions all data preceeding it. Thus-"Myrt 12(?)" the entire aircraft is questionable.

? - Question mark without parenthesis questions only the data with which it is immediately associated. Thus Myrt 12? indicates Myrt is known but the 12 is questionable.

# ENGINES

**DESIGNATION**

| Model<br>Manufacturer | TYPE 99 950 HP<br>Nakajima & Kawasaki | SAKAE MODEL 11<br>Nakajima & Ishikawajima | SAKAE MODEL 12<br>Nakajima & Ishikawajima |
|---|---|---|---|
| Other designations | Ha 35 Model 12, (Ha 25) | Ha 35 Model 11, (NK1B) | Ha 35 Model 12, (NK1C) |

**TYPE**

| | | | |
|---|---|---|---|
| Cylinder arrangement | Radial | Radial | Radial |
| Coolant | Air | Air | Air |
| Number of cylinders | 14 | 14 | 14 |

**PERFORMANCE (HP/RPM/AMP/ALT)**

| | | | |
|---|---|---|---|
| Take-off | 975/2700/38.8"/SL | 985/2550/39.8"/SL | 925/2550/39.8"/SL |
| W.E.P. | 975/2700/38.8"/SL | 985/2550/39.8"/SL | 925/2550/39.8"/SL |
| W.E.P. | 1040/2700/38.8"/10000'* | 1030/2550/39.8"/7500'* | 1010/2550/39.8"/11000'* |
| W.E.P. | | | |
| Military | 860/2600/35.0"/SL | 870/2550/35.8"/SL | 820/2500/35.8"/SL |
| Military | 955/2600/35.0"/11100' | 955/2500/35.8"/9850' | 935/2500/35.8"/13800' |
| Military | | | |

**FUEL**

| | | | |
|---|---|---|---|
| Cruise and normal | 87 | 92 | 92 |
| T.O./Mil./W.E.P. | 87 | 92 | 92 |

**CHARACTERISTICS**

| | | | | | | |
|---|---|---|---|---|---|---|
| Fuel metering system | | 2 BBL. U.D. Float Carb. | | 2 BBL. U.D. Float Carb. | | 2 BBL. U.D. Float Carb. |
| Compression ratio | | 6.7 | | 6.7 | | 6.7 |
| Propeller ratio | | .6875 | | .6875 | | .6875 |
| Supercharger | | Single Speed | | Single Speed | | Single Speed |
| Ratio (s) | | 7.125 | | 7.125 | | 7.53 |
| Imp. diam. - | mm. \| in. | 280 | 11" | 280 | 11" | 290 \| 11.4" |
| Diameter - | mm. \| in. | 1150 | 45.3" | 1150 | 45.3" | 1150 \| 45.3" |
| Bore/Stroke - | mm. \| in. | 130/150 | 5.12"/5.91" | 130/150 | 5.12"/5.91" | 130/150 \| 5.12"/5.91" |
| Displace. - | ltr. \| cu.in. | 27.9 | 1700 | 27.9 | 1700 | 27.9 \| 1700 |
| Dry wt. - | kg. \| lbs. | 530 | 1165 | 530 | 1165 | 530 \| 1165 |

**INSTALLED IN**

| Code name | | | |
|---|---|---|---|
| | OSCAR 1<br>LILY 1 | KATE 12 | ZEKE 11 & 21<br>RUFE 11 |

**REMARKS**

| | | | |
|---|---|---|---|
| | See page 874. | | See page 875. |

# ENGINES

**DESIGNATION**

| Model<br>Manufacturer | SAKAE MODEL 21<br>Nakajima & Ishikawajima | SAKAE MODEL 22<br>Nakajima | TYPE 2 1150 HP<br>Nakajima & Kawasaki |
|---|---|---|---|
| Other designations | Ha 35 Model 21, (NK1F) | Ha 35 Model 22, (NK1G) | Ha 35 Model 23, (Ha 115) |

**TYPE**

| | | | |
|---|---|---|---|
| Cylinder arrangement | Radial | Radial | Radial |
| Coolant | Air | Air | Air |
| Number of cylinders | 14 | 14 | 14 |

**PERFORMANCE (HP/RPM/AMP/ALT)**

| | | | |
|---|---|---|---|
| Take-off | 1115/2750/41.7"/SL | 1115/2750/41.7"/SL | 1105/2800/41.7"/SL |
| W.E.P. | 1115/2750/41.7"/SL | 1115/2750/41.7"/SL | 1105/2800/41.7"/SL |
| W.E.P. | 1180/2750/41.7"/7500'* | 1180/2750/41.7"/7500'* | 1165/2800/41.7"/8000'* |
| W.E.P. | 1040/2750/41.7"/18000'* | 1040/2750/41.7"/18000'* | 1030/2800/41.7"/18900'* |
| Military | 995/2700/37.8"/SL | 995/2700/37.8"/SL | 995/2700/37.8"/SL* |
| Military | 1085/2700/37.8"/9350' | 1085/2700/37.8"/9350' | 1085/2700/37.8"/9200' |
| Military | 965/2700/37.8"/19700' | 965/2700/37.8"/19700' | 965/2700/37.8"/19700' |

**FUEL**

| | | | |
|---|---|---|---|
| Cruise and normal | 92 | 92 | 92 |
| T.O./Mil./W.E.P. | 92 | 92 | 92 |

**CHARACTERISTICS**

| | | | | | | |
|---|---|---|---|---|---|---|
| Fuel metering system | | 2 BBL. D.D. Float Carb. | | 2 BBL. D.D. Float Carb. | | 2 BBL. D.D. Float Carb. |
| Compression ratio | | 7.0 | | 7.0 | | 7.0 |
| Propeller ratio | | .583 | | .5853 | | .6875 |
| Supercharger | | 2 Speed | | 2 Speed | | 2 Speed |
| Ratio (s) | | 6.37 & 8.44 | | 6.37 & 8.44 | | 6.37 & 8.44 |
| Imp. diam. - mm. | in. | 305 | 12.0" | 305 | 12.0" | 305 | 12.0" |
| Diameter - mm. | in. | 1150 | 45.3" | 1150 | 45.3" | 1150 | 45.3" |
| Bore/Stroke-mm. | in. | 130/150 | 5.12"/5.91" | 130/150 | 5.12"/5.91" | 130/150 | 5.12"/5.91" |
| Displace. - ltr. | cu.in. | 27.9 | 1700 | 27.9 | 1700 | 27.9 | 1700 |
| Dry wt. - kg. | lbs. | 590 | 1300 | 590 | 1300 | 600 | 1320 |

**INSTALLED IN**

| | | | |
|---|---|---|---|
| Code name | ZEKE 22, 32, & 52<br>RUFE 12 (?)<br>IRVING 11 | IRVING 11 (Exp)<br>(1 Sakae 21, 1 Sakae 22) | LILY 2<br>OSCAR 2 |

**REMARKS**

| | | | |
|---|---|---|---|
| | | Same as Sakae Model 21 except for direction of propeller rotation. | |

See page 876.

# ENGINES

## DESIGNATION

| | | | |
|---|---|---|---|
| Model<br>Manufacturer | | SAKAE Model 31<br>Nakajima | SAKAE Model 31 A<br>Nakajima |
| Other designations | Ha 35 Model 24 (Ha 115 SU) | Ha 35 Model 31, | Ha 35 Model 31 |

## TYPE

| | | | |
|---|---|---|---|
| Cylinder arrangement<br>Coolant<br>Number of cylinders | Radial<br>Air<br>14 | Radial<br>Air<br>14 | Radial<br>Air<br>14 |

## PERFORMANCE (HP/RPM/AMP/ALT)

| | | | |
|---|---|---|---|
| Take-off | | 1120/2800/41.7"/SL * | 1120/2800/41.7"/SL ** |
| W.E.P.<br>W.E.P.<br>W.E.P. | | 1120/2800/41.7"/SL *<br>1210/2800/41.7"/8000' *<br>1055/2800/41.7"/20400'* | 1120/2800/41.7"/SL *<br>1210/2800/41.7"/8000' *<br>1055/2800/41.7"/20400'* |
| Military<br>Military<br>Military | | 995/2700/37.8"/SL *<br>1085/2700/37.8"/9300' *<br>950/2700/37.8"/21700'* | 995/2700/37.8"/SL *<br>1085/2700/37.8"/9300' *<br>950/2700/37.8"/21700'* |

## FUEL

| | | | |
|---|---|---|---|
| Cruise and normal<br>T.O./Mil./ W.E.P. | | 92<br>92 & ADI | 92<br>92 |

## CHARACTERISTICS

| | | | | | |
|---|---|---|---|---|---|
| Fuel metering system | | 2 BBL. D.D. Low Pressure Inject | 2 BBL. D.D. Float Carb. | | 2 BBL. D.D. Float Carb. |
| Compression ratio | | | 7.0* | | 7.0 |
| Propeller ratio | | | .583 | | .583 |
| Supercharger | | | 2 Speed | | 2 Speed |
| Ratio (s) | | | 6.37 & 9.00 | | 6.37 & 9.00 |
| Imp.diam.- mm. | in. | | 305 | 12" | 305 \| 12" |
| Diameter - mm. | in. | | 1150 | 45.3" | 1150 \| 45.3" |
| Bore/Stroke-mm. | in. | | 130/150 | 5.12"/5.91" | 130/150 \| 5.12"/5.91" |
| Displace. - ltr. | cu.in. | | 27.9 | 1700 | 27.9 \| 1700 |
| Dry wt. - kg. | lbs. | | 590 | 1300 lbs. | 590 \| 1300 lbs. |

## INSTALLED IN

| | | | |
|---|---|---|---|
| Code name | OSCAR 2 | ZEKE 52 (?) | ZEKE 52 |

## REMARKS

| | | | |
|---|---|---|---|
| | Injectors located around diffuser casing.<br>Floatless carb. of similar principle as Stromberg injection carb. | Valve timing same as Homare 11.<br>High supercharger gear ratio increased over Model 21.<br>Has 10 min. W.E.P. rating.<br><br>See page 877. | Same as Model 31 but without ADI.<br>** Performance duration limited as for Model 21. ( 1 min. for T.O. and W.E.P.)<br><br>See page 877. |

# ENGINES

**DESIGNATION**

| Model<br>Manufacturer | SAKAE Model 31 B<br>Nakajima | TYPE 99 900 HP Model 2<br>Mitsubishi | ZUISEI Model 13<br>Mitsubishi |
|---|---|---|---|
| Other designations | Ha 35 Model 31 | Ha 31 Model 15,(Ha 26 Mod 2 | Ha 31 Model 13 |

**TYPE**

| | | | |
|---|---|---|---|
| Cylinder arrangement | Radial | Radial | Radial |
| Coolant | Air | Air | Air |
| Number of cylinders | 14 | 14 | 14 |

**PERFORMANCE (HP/RPM/AMP/ALT)**

| | | | |
|---|---|---|---|
| Take-off | 1120/2800/41.7"/SL * | 930/2600/38.0"/SL | 840/2600/37.0"/SL * |
| W.E.P. | 1120/2800/41.7"/SL * | 930/2600/38.0"/SL | 840/2600/37.0"/SL * |
| W.E.P. | 1210/2800/41.7"/8000' * | 990/2600/38.0"/7500' * | 910/2600/37.0"/11400' * |
| W.E.P. | 1080/2800/41.7"/18900'* | | |
| Military | 995/2700/37.8"/SL * | 850/2500/36.0"/SL | 770/2540/34.7"/SL |
| Military | 1085/2700/37.8"/9350' * | 910/2500/36.0"/8000' | 865/2540/34.7"/13100' |
| Military | 965/2700/37.8"/19700'* | | |

**FUEL**

| | | | |
|---|---|---|---|
| Cruise and normal | 92 | 87 | 87 |
| T.O./Mil./W.E.P. | 92 | 87 | 87 |

**CHARACTERISTICS**

| | | | | | | |
|---|---|---|---|---|---|---|
| Fuel metering system | | 2 BBL. D.D. Float Carb. | | 4 BBL. D.D. Float Carb. | | 4 BBL. D.D. Float Carb. |
| Compression ratio | | 7.0 | | | | 6.5 |
| Propeller ratio | | .583 | | .625 | | .727 |
| Supercharger | | 2 Speed | | Single Speed | | Single Speed |
| Ratio (s) | | 6.37 & 8.44 | | 8.48 | | 8.48 |
| Imp.diam.- mm. | in. | 305 | 12" | 230 | 9.05" | 260 | 10.25" |
| Diameter - mm. | in. | 1150 | 45.3" | 1118 | 44.05" | 1118 | 44.05" |
| Bore/Stroke-mm. | in. | 130/150 | 5.12"/5.91" | 140/130 | 5.51"/5.12" | 140/130 | 5.51"/5.12" |
| Displace. - ltr. | cu.in. | 27.9 | 1700 | 28.0 | 1710 | 28.0 | 1710 |
| Dry wt. - kg. | lbs. | 590 | 1300 lbs. | 526 | 1162 | 546 | 1200 |

**INSTALLED IN**

| | | | |
|---|---|---|---|
| Code name | ZEKE 52 (?) | SONIA 1<br>DINAH 1<br>THELMA 1 (Tr.) | PETE 11<br>JAKE 11 |

**REMARKS**

| | | | |
|---|---|---|---|
| | Same as Model 31 A but with high supercharger gear ratio same as SAKAE 21. | | |
| | See page 877. | See page 878. | |

# ENGINES

**DESIGNATION**

| | | | |
|---|---|---|---|
| Model<br>Manufacturer | TYPE 1 1050 HP<br>Mitsubishi | KINSEI Models 41 thru 44<br>Mitsubishi ** | KINSEI Models 45 & 46<br>Mitsubishi |
| Other designations | Ha 31 Model 21,(Ha 102) | | |

**TYPE**

| | | | |
|---|---|---|---|
| Cylinder arrangement | Radial | Radial | Radial |
| Coolant | Air | Air | Air |
| Number of cylinders | 14 | 14 | 14 |

**PERFORMANCE (HP/RPM/AMP/ALT)**

| | | | |
|---|---|---|---|
| Take-off | 1065/2700/40.5"/SL | 1045/2550/38.0"/SL | 985/2550/38.0"/SL |
| W.E.P. | 1065/2700/40.5"/SL | | |
| W.E.P. | 1135/2700/40.5"/8500' * | | |
| W.E.P. | 1020/2700/40.5"/18500'* | | |
| Military | 975/2600/37.0"/SL | 990/2500/35.8"/SL | 920/2500/35.8"/SL |
| Military | 1040/2600/37.0"/9200' | 1065/2500/35.8"/6600' | 1055/2500/35.8"/13800' |
| Military | 935/2600/37.0"/19000' | | |

**FUEL**

| | | | |
|---|---|---|---|
| Cruise and normal | 92 | 87 | 92 |
| T.O./Mil./W.E.P. | 92 | 92 | 92 |

**CHARACTERISTICS**

| | | | | | | |
|---|---|---|---|---|---|---|
| Fuel metering system | | 4 BBL. D.D. Float Carb. | | 3 BBL. D.D. Float Carb. | | 3 BBL. D.D. Float Carb. |
| Compression ratio | | 7.0 | | 6.6 | | 6.6 |
| Propeller ratio | | .625 | | .700 | | .700 |
| Supercharger | | 2 Speed | | Single Speed | | Single Speed |
| Ratio (s) | | 7.0 & 9.118 | | 8.485 | | 8.485 |
| Imp.diam.- mm. | in. | 280 | 11.02" | 245 | 9.65" | 280 \| 11.0" |
| Diameter - mm. | in. | 1118 | 44.05" | 1218 | 48.0" | 1218 \| 48.0" |
| Bore/Stroke-mm. | in. | 140/130 | 5.51"/5.12" | 140/150 | 5.51"/5.91" | 140/150 \| 5.51"/5.91" |
| Displace. - ltr. | cu.in. | 28.02 | 1710 | 32.34 | 1970 | 32.34 \| 1970 |
| Dry wt. - kg. | lbs. | 565 | 1250 | 560 | 1240 | 560 \| 1240 |

**INSTALLED IN**

| | | | |
|---|---|---|---|
| Code name | DINAH 2<br>NICK 1 | TESS 11 (43)<br>JAKE 11 (43,44) | MAVIS 22 (46) |

**REMARKS**

| | | | |
|---|---|---|---|
| | | Models same except for accessories.<br><br>** 44 also mfd. by Hiro. | Models same except for accessories. |
| | See page 879. | See page 880. | See page 880. |

# ENGINES

## DESIGNATION

| | | | |
|---|---|---|---|
| Model<br>Manufacturer | KINSEI Models 51 thru 54<br>Mitsubishi | Mitsubishi | KINSEI Model 62<br>Mitsubishi |
| Other designation | Ha 33 Mod 51 thru54 (**) | Ha33 Mod62(Ha112 Mod.2) | Ha33 Mod62 (MK8P) |

## TYPE

| | | | |
|---|---|---|---|
| Cylinder arrangement | Radial | Radial | Radial |
| Coolant | Air | Air | Air |
| Number of cylinders | 14 | 14 | 14 |

## PERFORMANCE (HP/RPM/AMP/ALT)

| | | | |
|---|---|---|---|
| Take-off | 1280/2600/42.9"/SL | 1580/2600/49.6"/SL | ( ) |
| W.E.P. | 1280/2600/42.9"/SL | 1580/2600/49.6"/SL | ( Estimated ) |
| W.E.P. | 1355/2600/42.9"/7700' * | 1620/2600/49.6"/2900' * | ( same ) |
| W.E.P. | 1240/2600/42.9"/18500'* | 1490/2600/49.6"/16700'* | ( as ) |
| Military | 1075/2500/37.8"/SL | 1200/2500/41.7"/SL | ( Ha 112 Model 2 ) |
| Military | 1185/2500/37.8"/9850' | 1280/2500/41.7"/6550' | ( ) |
| Military | 1085/2500/37.8"/20300' | 1185/2500/41.7"/19700' | ( ) |

## FUEL

| | | | |
|---|---|---|---|
| Cruise and normal | 92) or (87 | 92 | 92 |
| T.O./Mil./Combat | 92) or (87 & ADI | 92 & ADI | 92 & ADI |

## CHARACTERISTICS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Fuel metering system | | 4 BBL. D.D. Float Carb. | | Direct Injection Pump | | Direct Injection Pump | |
| Compression ratio | | 7.0 | | 7.0 | | | |
| Propeller ratio | | .633 | | .633 | | .636 ? | |
| Supercharger | | 2 speed | | 2 speed | | 2 speed | |
| Ratio (s) | | 7.0 & 9.118 | | 7.0 & 9.118 | | 7.0 & 9.118 | |
| Imp. diam. | -mm. in. | 290 | 11.4" | 320 | 12.6" | | |
| Diameter | -mm. in. | 1218 | 48.0" | 1218 | 48.0" | | |
| Bore/Stroke | -mm. in. | 140/150 | 5.51/5.91" | 140/150 | 5.51"/5.91" | 140/150 | 5.51"/5.91" |
| Displace | - ltr. cu.in. | 32.34 | 1970 | 32.34 | 1970 | 32.34 | 1970 |
| Dry wt. | - kg. lbs. | 609 | 1340 | 609 | 1340 | | |

## INSTALLED IN

| | | | |
|---|---|---|---|
| Code name | VAL 22 (51 & 54)<br>NELL 23 (51, 52 & 53)<br>NELL 23 Tr (52)<br>TABBY 22 Tr (51, 52 & 53) | DINAH 3 | JUDY 33 |

## REMARKS

| | | | |
|---|---|---|---|
| | TABBY 32 Tr.(?) (53)<br>MAVIS 23 (51 & 53)<br>EDNA 1 (51)<br>PAUL 11 (54)<br>Engines same except for Accessories<br>**(MK8A,MK8(B?), MK8(C?) MK8(D?), respectively) | | |
| | See Page 881. | See Page 881. | |

# ENGINES

**DESIGNATION**

| Model | ATSUTA Model 21 | ATSUTA Model 31 | TYPE 2 1100 HP |
|---|---|---|---|
| Manufacturer | Aichi | Aichi | Kawasaki |
| Other designation | Ha 60 Model 21, (AE1A) | Ha 60 Model 31, (AE1P) | Ha 60 Model 22, (Ha 40) |

**TYPE**

| Cylinder arrangement | Inverted V | Inverted V | Inverted V |
|---|---|---|---|
| Coolant | Liquid | Liquid | Liquid |
| Number of cylinders | 12 | 12 | 12 |

**PERFORMANCE (HP/RPM/AMP/ALT)**

| Take-off | 1185/2500/42.7"/SL | 1380/2800/42.7"/SL | 1160/2500/42.9"/SL |
|---|---|---|---|
| W.E.P. | 1185/2500/42.7"/SL | 1380/2800/42.7"/SL | 1160/2500/42.9"/SL |
| W.E.P. | 1205/2500/42.7"/1400' * | 1440/2800/42.7"/5700' * | |
| W.E.P. | 1140/2500/42.7"/12300'* | 1320/2800/42.7"/17700'* | 1100/2500/42.9"/12600' |
| Military | 935/2400/35.8"/SL | 1265/2600/39.8"/SL | 1030/2400/39.0"/SL |
| Military | 995/2400/35.8"/4930' | 1320/2600/39.8"/5550' | |
| Military | 955/2400/35.8"/14800' | 1265/2600/39.8"/16400' | 1085/2400/39.0"/13800' |

**FUEL**

| Cruise and normal | 91 | 92 | 92 |
|---|---|---|---|
| T.O./Mil./Combat | 91 | 92 | 92 |

**CHARACTERISTICS**

| Fuel metering system | Direct Injection Pump | | Direct Injection Pump | | Direct Injection Pump | |
|---|---|---|---|---|---|---|
| Compression ratio | 6.9 | | 7.2 | | 6.7 | |
| Propeller ratio | .643 | | .593 | | .643 | |
| Supercharger | Variable Speed | | Variable Speed | | Variable Speed | |
| Ratio (s) | 10.04 (without slip) ** | | 10.04 (without slip) ** | | 10.39 (-3% slip) | |
| Imp. diam. -mm. / in. | 260 | 10.25" | 265 | 10.42" | 260 | 10.25" |
| Diameter -mm. / in. | *** | | *** | | ** | |
| Bore/Stroke -mm. / in. | 150/160 | 5.91"/6.3" | 150/160 | 5.91"/6.3" | 150/160 | 5.91"/6.3" |
| Displace - ltr. / cu.in. | 33.9 | 2070 | 33.9 | 2070 | 33.9 | 2070 |
| Dry wt. - kg. / lbs. | 625 | 1380 | 715 | 1576 | 685 | 1500 |

**INSTALLED IN**

| Code name | JUDY 11<br>JUDY 21 | JUDY 12<br>JUDY 22 | TONY 1 |
|---|---|---|---|

**REMARKS**

| | *** Length - 1722 \| 68"<br>Width - 712 \| 28.0"<br>Height - 1072 \| 42.2"<br><br>** Actual Range - 7.03 to 9.7 | *** Length - 2150 \| 85"<br>Width - 712 \| 28.0"<br>Height - 1060 \| 41.7"<br><br>** Actual Range - 7.10 to 9.7 | ** Length - 1720 \| 67.7"<br>Width - 712 \| 28.0"<br>Height - 1000 \| 39.4" |
|---|---|---|---|
| | See Page 882. | See Page 883. | See Page 884. |

# ENGINES

**DESIGNATION**

| Model<br>Manufacturer | HOMARE Model 11<br>Nakajima | HOMARE Model 12<br>Nakajima | Nakajima |
|---|---|---|---|
| Other designations | Ha 45 Model 11, (NK9B) | Ha 45 Model 12, (NK9-)** | Ha 45 Model 12, (Ha 45) |

**TYPE**

| | | | |
|---|---|---|---|
| Cylinder arrangement | Radial | Radial | Radial |
| Coolant | Air | Air | Air |
| Number of cylinders | 18 | 18 | 18 |

**PERFORMANCE (HP/RPM/AMP/ALT)**

| | | | |
|---|---|---|---|
| Take-off | 1795/2900/45.7"/SL | 1795/2900/45.7"/SL | 1825/2900/46.4"/SL |
| W.E.P. | 1795/2900/45.7"/SL | 1795/2900/45.7"/SL | 1825/2900/46.4"/SL |
| W.E.P. | 1840/2900/45.7"/3000' * | 1840/2900/45.7"/3000' * | 1860/2900/46.4"/1800' * |
| W.E.P. | 1610/2900/45.7"/15400'* | 1610/2900/45.7"/15400'* | 1620/2900/46.4"/15100'* |
| Military | 1540/2900/39.8"/SL | 1540/2900/39.8"/SL | 1545/2900/39.8"/SL |
| Military | 1625/2900/39.8"/6560' | 1625/2900/39.8"/6560' | 1645/2900/39.8"/5900' |
| Military | 1420/2900/39.8"/18700' | 1420/2900/39.8"/18700' | 1420/2900/39.8"/18700' |

**FUEL**

| | | | |
|---|---|---|---|
| Cruise and normal | 92 | 92 | |
| T.O./Mil./W.E.P. | 92 & ADI | 92 & ADI | |

**CHARACTERISTICS**

| | | | | | | |
|---|---|---|---|---|---|---|
| Fuel metering system | 2 BBL. D.D. Float Carb. | | 2 BBL. D.D. Float Carb. | | 2 BBL. D.D. Float Carb. | |
| Compression ratio | 7.0 | | 7.0 | | | |
| Propeller ratio | .500 (Farman Type ) | | .422 | | | |
| Supercharger | 2 Speed | | 2 Speed | | 2 Speed | |
| Ratio (s) | 5.47 & 7.49 | | 5.47 & 7.49 | | 5.81 & 7.95 | |
| Imp.diam.- mm. \| in. | 320 | 12.6" | 320 | 12.6" | | |
| Diameter - mm. \| in. | 1180 | 46.5" | 1180 | 46.5" | 1180 | 46.5" |
| Bore/Stroke-mm. \| in. | 130/150 | 5.12"/5.91" | 130/150 | 5.12"/5.91" | 130/150 | 5.12"/5.91" |
| Displace. - ltr. \| cu.in. | 35.8 | 2185 | 35.8 | 2185 | 35.8 | 2185 |
| Dry wt. - kg. \| lbs. | 830 | 1830 | 830 | 1830 | | |

**INSTALLED IN**

| | | | |
|---|---|---|---|
| Code name | FRANCES 11<br>GRACE 11<br>MYRT 11(?) | | FRANK 1 |

**REMARKS**

| | | | |
|---|---|---|---|
| | Experimental designation of Army Counterpart - Ha 45 Special | ** Possibly NK9C | Army counterpart of Homare 12 |

See page 885.

# ENGINES

## DESIGNATION

| | | | |
|---|---|---|---|
| Model<br>Manufacturer | HOMARE Model 21<br>Nakajima | Nakajima | HOMARE Model 22<br>Nakajima |
| Other designations | Ha 45 Model 21, (NK9H) | Ha 45 Model 21 (**) | Ha 45 Model 22 (NK9K) |

## TYPE

| | | | |
|---|---|---|---|
| Cylinder arrangement<br>Coolant<br>Number of cylinders | Radial<br>Air **<br>18 | Radial<br>Air<br>18 | Radial<br>Air (Fan Assisted)**<br>18 |

## PERFORMANCE (HP/RPM/AMP/ALT)

| | | | |
|---|---|---|---|
| Take-off | 1970/3000/49.6"/SL | 1970/3000/49.6"/SL | 1970/3000/49.6"/SL |
| W.E.P.<br>W.E.P.<br>W.E.P. | 1970/3000/49.6"/SL<br>2050/3000/49.6"/2500' *<br>1830/3000/49.6"/16500' * | 1970/3000/49.6"/SL<br>2050/3000/49.6"/2500' *<br>1850/3000/49.6"/17600'* | |
| Military<br>Military<br>Military | 1765/3000/43.7"/SL<br>1875/3000/43.7"/5900'<br>1675/3000/43.7"/19600' | 1765/3000/43.7"/SL<br>1875/3000/43.7"/5900'<br>1695/3000/43.7"/21000' | <br><br>1725/3000/43.7/19600' |

## FUEL

| | | | |
|---|---|---|---|
| Cruise and normal<br>T.O./Mil./ W.E.P. | 91<br>91 & ADI | | 92<br>92 & ADI |

## CHARACTERISTICS

| | | | | | | |
|---|---|---|---|---|---|---|
| Fuel metering system | 2 BBL. D.D. Float Carb. | | 2 BBL. D.D. Float Carb. | | | |
| Compression ratio | 8.0 | | 8.0 | | | |
| Propeller ratio | .500 (Farman type) | | .500 (Farman type) | | .422 | |
| Supercharger | 2 Speed | | 2 Speed | | | |
| Ratio (s) | 5.81 & 7.95 | | | | | |
| Imp.diam.- mm. in. | 320 | 12.6" | | | | |
| Diameter - mm. in. | 1180 | 46.5" | 1180 | 46.5" | 1180 | 46.5" |
| Bore/Stroke-mm. in. | 130/150 | 5.12"/5.91" | 130/150 | 5.12"/5.91" | 130/150 | 5.12"/5.91" |
| Displace. - ltr. cu.in. | 35.8 | 2185 | 35.8 | 2185 | 35.8 | 2185 |
| Dry wt. - kg. lbs. | 810 | 1785 | | | | |

## INSTALLED IN

| | | | |
|---|---|---|---|
| Code name | GEORGE 11<br>SAM 11<br>MYRT 11. | FRANK 1 | MYRT 11 (?) |

## REMARKS

| | | | |
|---|---|---|---|
| | ** One version of the 21, probably experimental, used cooling fan. Captured engine has closer finning than fan version and does not use fan. | ** Believed to be engine identified as "Ha 45 improved". Army counterpart of Homare 21. | ** Later versions may not use fan. See comments under Homare 21. |

See page 886.

# ENGINES

## DESIGNATION

| | | | |
|---|---|---|---|
| Model<br>Manufacturer | HOMARE Model 41<br>Nakajima | TYPE 100 1250 HP<br>Nakajima | TYPE 2 1450 HP<br>Nakajima |
| Other designations | Ha 45 Model 41, (NK9A) | Ha 34 Model 01, (Ha 41) | Ha 34 Model 11, (Ha 109) |

## TYPE

| | | | |
|---|---|---|---|
| Cylinder arrangement<br>Coolant<br>Number of cylinders | Radial<br>Air<br>18 | Radial<br>Air<br>14 | Radial<br>Air<br>14 |

## PERFORMANCE (HP/RPM/AMP/ALT)

| | | | |
|---|---|---|---|
| Take-off | | 1185/2500/37.8"/SL | 1500/2650/41.7"/SL |
| W.E.P.<br>W.E.P.<br>W.E.P. | | 1185/2500/37.8"/SL<br>1320/2500/37.8"/11500'* | 1500/2650/41.7"/SL<br>1570/2650/41.7"/5000' *<br>1440/2650/41.7"/15400'* |
| Military<br>Military<br>Military | | 1105/2450/35.8"/SL<br>1245/2450/35.8"/12100' | 1320/2600/37.8"/SL<br>1420/2600/37.8"/7050'<br>1300/2600/37.8"/17200' |

## FUEL

| | | | |
|---|---|---|---|
| Cruise and normal<br>T.O./Mil./W.E.P. | | 92<br>92 | 92) or (87<br>92) or (87 & ADI |

## CHARACTERISTICS

| | | | | | |
|---|---|---|---|---|---|
| Fuel metering system | | | 3 BBL. D.D. Float Carb. | | 3 BBL.D.D. Float Carb. |
| Compression ratio | | | 6.7 | | 6.9 |
| Propeller ratio | | .422 | .6875 | | .6875 |
| Supercharger | | 2 Stage | Single Speed | | 2 Speed |
| Ratio (s) | | | 8.24 | | 6.54 & 8.65 |
| Imp.diam.- mm. | in. | | 280 | 11.0" | 305 | 12.0" |
| Diameter - mm. | in. | | 1260 | 49.7" | 1260 | 49.7" |
| Bore/Stroke-mm. | in. | | 146/160 | 5.75"/6.3" | 146/160 | 5.75"/6.3" |
| Displace. - ltr. | cu.in. | | 37.5 | 2290 | 37.5 | 2290 |
| Dry wt. - kg. | lbs. | | 630 | 1380 | 720 | 1580 |

## INSTALLED IN

| | | | |
|---|---|---|---|
| Code name | SAM 11 | HELEN 1<br>TOJO 1 | HELEN 2<br>TOJO 2 |

## REMARKS

| | | | |
|---|---|---|---|
| | | | See page 887. |

# ENGINES

**DESIGNATION**

| Model<br>Manufacturer | TYPE 100 1450 HP<br>Mitsubishi | KASEI Model 11<br>Mitsubishi & Hiro | KASEI Model 12<br>Mitsubishi |
|---|---|---|---|
| Other designations | Ha 32 Model 11, (Ha 101) | Ha 32 Model 11, (MK4A) | Ha 32 Model 12, (MK4B) |

**TYPE**

| | | | |
|---|---|---|---|
| Cylinder arrangement | Radial | Radial | Radial |
| Coolant | Air | Air | Air |
| Number of cylinders | 14 | 14 | 14 |

**PERFORMANCE (HP/RPM/AMP/ALT)**

| | | | |
|---|---|---|---|
| Take-off | 1490/2450/39.4"/SL | 1505/2450/39.8"/SL | 1505/2450/39.8"/SL |
| W.E.P. | 1490/2450/39.4"/SL | 1505/2450/39.8"/SL | 1505/2450/39.8"/SL |
| W.E.P. | 1580/2450/39.4"/7500' * | 1580/2450/39.8"/6400' * | 1580/2450/39.8"/6400' * |
| W.E.P. | 1470/2450/39.4"/14100'* | 1470/2450/39.8"/12800'* | 1470/2450/39.8"/12800'* |
| Military | 1310/2350/36.4"/SL | 1340/2350/37.0"/SL | 1340/2350/37.0"/SL |
| Military | 1445/2350/36.4"/8550' | 1460/2350/37.0"/7200' | 1460/2350/37.0"/7200' |
| Military | 1360/2350/36.4"/15100' | 1360/2350/37.0"/13500' | 1360/2350/37.0"/13500' |

**FUEL**

| | | | |
|---|---|---|---|
| Cruise and normal | 92 | 92 | 92 |
| T.O./Mil./W.E.P. | 92 | 92 | 92 |

**CHARACTERISTICS**

| | | | | | | |
|---|---|---|---|---|---|---|
| Fuel metering system | | 4 BBL. D.D. Float Carb. | | 4 BBL. D.D. Float Carb. | | 4 BBL. D.D. Float Carb. |
| Compression ratio | | 6.5 | | 6.5 | | 6.5 |
| Propeller ratio | | .684 | | .684 | | .500 (Farman type) |
| Supercharger | | 2 Speed | | 2 Speed | | 2 Speed |
| Ratio (s) | | 7.4 & 9.118 | | 7.4 & 9.118 | | 7.4 & 9.118 |
| Imp.diam.- mm. | in. | 280 | 11.0" | 280 | 11.0" | 280 | 11.0" |
| Diameter - mm. | in. | 1340 | 52.7" | 1340 | 52.7" | 1340 | 52.7" |
| Bore/Stroke-mm. | in. | 150/170 | 5.91"/6.69" | 150/170 | 5.91"/6.69" | 150/170 | 5.91"/6.69" |
| Displace. - ltr. | cu.in. | 42.1 | 2570 | 42.1 | 2570 | 42.1 | 2570 |
| Dry wt. - kg. | lbs. | | 1595 * | 725 | 1595 | 740 | 1630 |

**INSTALLED IN**

| | | | |
|---|---|---|---|
| Code name | SALLY 2 | BETTY 11 and 11 (Trans.)<br>LIZ 11 | EMILY 11 |

**REMARKS**

| | | | |
|---|---|---|---|
| | May be equipped with ADI. | | |
| | See page 888. | See page 888. | See page 888. |

# ENGINES

**DESIGNATION**

| Model<br>Manufacturer | KASEI Model 13<br>Mitsubishi | KASEI Model 14<br>Mitsubishi | KASEI Model 15<br>Mitsubishi & Hiro |
|---|---|---|---|
| Other designations | Ha 32 Model 13, (MK4C) | Ha 32 Model 14, (MK4D) | Ha 32 Model 15, (MK4(C?) |

**TYPE**

| | | | |
|---|---|---|---|
| Cylinder arrangement | Radial | Radial | Radial |
| Coolant | Air | Air | Air |
| Number of cylinders | 14 | 14 | 14 |

**PERFORMANCE (HP/RPM/AMP/ALT)**

| | | | |
|---|---|---|---|
| Take-off | 1440/2450/39.8"/SL | 1440/2450/39.8"/SL | 1440/2450/39.8"/SL |
| W.E.P. | 1440/2450/39.8"/SL | 1440/2450/39.8"/SL | 1440/2450/39.8"/SL |
| W.E.P. | 1530/2450/39.8"/7800' * | 1530/2450/39.8"/7800' * | 1530/2450/39.8"/7800' * |
| W.E.P. | 1405/2450/39.8"/19000'* | 1405/2450/39.8"/19000'* | 1405/2450/39.8"/19000'* |
| Military | 1290/2350/37.0"/SL | 1290/2350/37.0"/SL | 1290/2350/37.0"/SL |
| Military | 1400/2350/37.0"/8550' | 1440/2350/37.0"/8550' | 1400/2350/37.0"/8550' |
| Military | 1280/2350/37.0"/19700' | 1280/2350/37.0"/19700' | 1280/2350/37.0"/19700' |

**FUEL**

| | | | |
|---|---|---|---|
| Cruise and normal | 92 | 92 | 92 or 87 (Mits.) |
| T.O./Mil./W.E.P. | | 92 | 92 |

**CHARACTERISTICS**

| | | | | | | |
|---|---|---|---|---|---|---|
| Fuel metering system | 4 BBL. D.D. Float Carb. | | 4 BBL. D.D. Float Carb. | | 4 BBL. D.D. Float Carb. | |
| Compression ratio | 6.5 | | 6.5 | | 6.5 | |
| Propeller ratio | .684 | | .625** | | .684 | |
| Supercharger | 2 Speed | | 2 Speed | | 2 Speed | |
| Ratio (s) | 7.0 & 9.118 | | 7.0 & 9.118 | | 7.0 & 9.118 | |
| Imp.diam.- mm. \| in. | 320 | 12.6" | 320 | 12.6" | 320 | 12.6" |
| Diameter - mm. \| in. | 1340 | 52.7" | 1340 | 52.7" | 1340 | 52.7" |
| Bore/Stroke-mm. \| in. | 150/170 | 5.91"/6.69" | 150/170 | 5.91"/6.69" | 150/170 | 5.91"/6.69" |
| Displace. - ltr. \| cu.in. | 42.1 | 2570 | 42.1 | 2570 | 42.1 | 2570 |
| Dry wt. - kg. \| lbs. | 770 | 1700 | 800 | 1760 | 725 | 1600 |

**INSTALLED IN**

| Code name | REX 11 | NORM 11 (?) | BETTY 11 |
|---|---|---|---|

**REMARKS**

| | | | |
|---|---|---|---|
| | Has extended propeller shaft. | ** Has contra-rotating propellers. | |
| | See page 889. | See page 889. | |

# ENGINES

**DESIGNATION**

| Model<br>Manufacturer | KASEI Model 21<br>Mitsubishi | KASEI Model 22<br>Mitsubishi | KASEI Model 23 & 23 Kō**<br>Mitsubishi |
|---|---|---|---|
| Other designations | Ha 32 Model 21, (MK4P) | Ha 32 Model 22, (MK4Q) | Ha 32 Model 23, (MK4R) |

**TYPE**

| | | | |
|---|---|---|---|
| Cylinder arrangement | Radial | Radial | Radial |
| Coolant | Air | Air | Air (Fan Assisted) |
| Number of cylinders | 14 | 14 | 14 |

**PERFORMANCE (HP/RPM/AMP/ALT)**

| | | | |
|---|---|---|---|
| Take-off | 1825/2600/47.7"/SL | 1825/2600/47.7"/SL | 1870/2600/47.7"/SL |
| W.E.P. | 1825/2600/47.7"/SL | 1825/2600/47.7"/SL | 1870/2600/47.7"/SL |
| W.E.P. | 1880/2600/47.7"/4400' * | 1880/2600/47.7"/4400' * | 1940/2600/47.7"/4400' * |
| W.E.P. | 1735/2600/47.7"/16800'* | 1735/2600/47.7"/16800'* | 1785/2600/47.7"/16600'* |
| Military | 1550/2500/41.7"/SL | 1550/2500/41.7"/SL | 1580/2500/41.7"/SL |
| Military | 1655/2500/41.7"/6900' | 1655/2500/41.7"/6900' | 1695/2500/41.7"/6900' |
| Military | 1520/2500/41.7"/18050' | 1520/2500/41.7"/18050' | 1560/2500/41.7"/18050' |

**FUEL**

| | | | |
|---|---|---|---|
| Cruise and normal | 92 | 92 | 92 |
| T.O./Mil./ W.E.P. | 92 & ADI | 92 & ADI | 92 & ADI |

**CHARACTERISTICS**

| | | | | | | |
|---|---|---|---|---|---|---|
| Fuel metering system | | 4 BBL. D.D. Float Carb. | | 4 BBL. D.D. Float Carb. | | Direct Injection Pump. |
| Compression ratio | | 6.5 | | 6.5 | | 6.5 |
| Propeller ratio | | .540 | | .500 (Farman type) | | .540 |
| Supercharger | | 2 Speed | | 2 Speed | | 2 Speed |
| Ratio (s) | | 7.0 & 9.118 | | 7.0 & 9.118 | | 7.0 & 9.118 |
| Imp.diam.- mm. | in. | 320 | 12.6" | 320 | 12.6" | 320 \| 12.6" |
| Diameter - mm. | in. | 1340 | 52.7" | 1340 | 52.7" | 1340 \| 52.7" |
| Bore/Stroke-mm. | in. | 150/170 | 5.91"/6.69" | 150/170 | 5.91"/6.69" | 150/170 \| 5.91"/6.69" |
| Displace. - ltr. | cu.in. | 42.1 | 2570 | 42.1 | 2570 | 42.1 \| 2570 |
| Dry wt. - kg. | lbs. | 780 | 1720 | 750 | 1650 | 860 \| 1895 |

**INSTALLED IN**

| Code name | BETTY 22<br>LIZ 11 | EMILY 12, 22 & 32 (Trans) | JACK 11 |
|---|---|---|---|

**REMARKS**

| | | | |
|---|---|---|---|
| | | | ** Model 23 Kō is same as Model 23 excepted for generator speed ratio increased to 2.438 |

See page 890.

# ENGINES

**DESIGNATION**

| Model<br>Manufacturer | KASEI Model 24<br>Mitsubishi | KASEI Model 25<br>Mitsubishi | KASEI Model 26<br>Mitsubishi |
|---|---|---|---|
| Other designations | Ha 32 Model 24, (MK4S) | Ha 32 Model 25, (MK4T) | Ha 32 Model 26, (MK4(U?) |

**TYPE**

| | | | |
|---|---|---|---|
| Cylinder arrangement<br>Coolant<br>Number of cylinders | Radial<br>Air<br>14 | Radial<br>Air<br>14 | Radial<br>Air<br>14 |

**PERFORMANCE (HP/RPM/AMP/ALT)**

| | | | |
|---|---|---|---|
| Take-off | 1825/2600/47.7"/SL | 1825/2600/47.7"/SL | |
| W.E.P.<br>W.E.P.<br>W.E.P. | 1825/2600/47.7"/SL<br>1880/2600/47.7"/4400' *<br>1735/2600/47.7"/16800'* | 1825/2600/47.7"/SL<br>1880/2600/47.7"/4400' *<br>1735/2600/47.7"/16800'* | |
| Military<br>Military<br>Military | 1550/2500/41.7"/SL<br>1655/2500/41.7"/6900'<br>1520/2500/41.7"/18050 | 1550/2500/41.7"/SL<br>1655/2500/41.7"/6900'<br>1520/2500/41.7"/18050' | |

**FUEL**

| | | | |
|---|---|---|---|
| Cruise and normal<br>T.O./Mil./W.E.P. | 92<br>92 & ADI | 92<br>92 & ADI | |

**CHARACTERISTICS**

| | | | | | | |
|---|---|---|---|---|---|---|
| Fuel metering system | | 4 BBL. D.D. Float Carb. | | 4 BBL. D.D. Float Carb. | | Direct Injection Pump.** |
| Compression ratio | | 6.5 | | 6.5 | | |
| Propeller ratio | | .625** | | .625 | | |
| Supercharger | | 2 Speed | | 2 Speed | | |
| Ratio (s) | | 7.0 & 9.118 | | 7.0 & 9.118 | | |
| Imp. diam. - mm. | in. | 320 | 12.6" | 320 | 12.6" | |
| Diameter - mm. | in. | 1340 | 52.7" | 1340 | 52.7" | 1340 52.7" |
| Bore/Stroke-mm. | in. | 150/170 | 5.91"/6.69" | 150/170 | 5.91"/6.69" | 150/170 5.91"/6.69" |
| Displace. - ltr. | cu.in. | 42.1 | 2570 | 42.1 | 2570 | 42.1 2570 |
| Dry wt. - kg. | lbs. | 800 | 1760 | 760 | 1680 | |

**INSTALLED IN**

| | | | |
|---|---|---|---|
| Code name | LUKE 11 (?)<br>NORM 11 (?)<br>REX 11 (?) | BETTY 24 & 34<br>JILL 12<br>FRANCES 12 (?) | |

**REMARKS**

| | | | |
|---|---|---|---|
| | **Has contra-rotating propellers. | Experimental designation of Army Counterpart -Ha 111 | Altitude performances increased over Model 23.<br><br>** Probable. |

# ENGINES

**DESIGNATION**

| | | | |
|---|---|---|---|
| Model<br>Manufacturer | KASEI Model 27<br>Mitsubishi | MAMORU Model 11 | MAMORU Model 12 |
| Other designations | Ha 32 Model 27, (MK4(V?) | (NK7A) | (NK7A) |

**TYPE**

| | | | |
|---|---|---|---|
| Cylinder arrangement | Radial | Radial | Radial |
| Coolant | Air | Air | Air |
| Number of cylinders | 14 | 14 | 14 |

**PERFORMANCE (HP/RPM/AMP/ALT)**

| | | | |
|---|---|---|---|
| Take-off | 1795/2600/47.7"/SL | 1850/2600/45.6"/SL | 1850/2600/45.6"/SL |
| W.E.P. | 1795/2600/47.7"/SL | 1850/2600/45.6"/SL | 1850/2600/45.6"/SL |
| W.E.P. | 1880/2600/47.7"/6000* | | |
| W.E.P. | 1700/2600/47.7"/20,300* | | |
| Military | 1560/2500/41.7"/SL | 1660/2500/41.7"/SL | 1660/2500/41.7"/SL |
| Military | 1670/2500/41.7"/8500' | 1730/2500/41.7"/4600' | 1730/2500/41.7"/4600' |
| Military | 1480/2500/41.7"/21,600' | 1580/2500/41.7"/16'00' | 1580/2500/41.7"/16100' |

**FUEL**

| | | | |
|---|---|---|---|
| Cruise and normal | 87 | 92 | 92 |
| T.O./Mil./W.E.P. | 87 & ADI | 92 | 92 |

**CHARACTERISTICS**

| | | | | | | |
|---|---|---|---|---|---|---|
| Fuel metering system | | 4 BBL. D.D. Float Carb.** | | 2 BBL. D.D. Float Carb. | | 2 BBL. D.D. Float Carb. |
| Compression ratio | | 6.5 | | 6.5 | | 6.5 |
| Propeller ratio | | .625 | | .578 | | .422 |
| Supercharger | | 2 Speed | | 2 Speed | | 2 Speed |
| Ratio (s) | | | | 6.17 & 8.46 | | 6.17 & 8.46 |
| Imp. diam.- mm. | in. | 320 | 12.6" | 320 | 12.6" | 320 | 12.6" |
| Diameter - mm. | in. | | | 1400 | 55" | 1400 | 55" |
| Bore/Stroke-mm. | in. | 150/170 | 5.91"/6.69" | 155/170 | 6.1"/6.69" | 155/170 | 6.1"/6.69" |
| Displace. - ltr. | cu.in. | 42.1 | 2570 | 44.9 | 2740 | 44.9 | 2740 |
| Dry wt. - kg. | lbs. | | | 885 | 1960 | 885 | 1960 |

**INSTALLED IN**

| | | | |
|---|---|---|---|
| Code name | BETTY 25 | JILL 11<br>LIZ 11 | JILL 11<br>LIZ 12 ? |

**REMARKS**

| | | | |
|---|---|---|---|
| | Altitude performances increased over Model 25.<br><br>** Probable | See page 891. | |

# ENGINES

**DESIGNATION**

| Model<br>Manufacturer | MAMORU Model 21<br>Nakajima | MAMORU Model 22<br>Nakajima | Jusei Model 11 (?)<br>Mitsubishi |
|---|---|---|---|
| Other designation | (NK7B) | (NK7B) | Ha 42 Model 11 (MK6A) |

**TYPE**

| | | | |
|---|---|---|---|
| Cylinder arrangement | Radial | Radial | Radial |
| Coolant | Air | Air | Air (Fan assisted) |
| Number of cylinders | 14 | 14 | 18 |

**PERFORMANCE (HP/RPM/AMP/ALT)**

| | | | |
|---|---|---|---|
| Take-off | 1970/2550/48.5"/SL | 1970/2550/48.5"/SL | 1970/2450/40.7"/SL |
| W.E.P. | 1970/2550/48.5"/SL | 1970/2550/48.5"/SL | 1970/2450/40.7"/SL |
| W.E.P. | 2020/2550/48.5"/1850' * | 2040/2550/48.5"/3200' * | 2040/2450/40.7"/3100' * |
| W.E.P. | 1745/2550/48.5"/13600' * | 1750/2550/48.5"/16500' * | 1860/2450/40.7"/15500' * |
| Military | 1775/2500/43.7"/SL | 1700/2500/43.7"/SL * | 1735/2350/36.6"/SL |
| Military | 1875/2500/43.7"/3940' | 1850/2500/43.7"/5600' * | 1825/2350/36.6"/4590' |
| Military | 1660/2300/43.7"/14750' | 1615/2500/43.7"/18050' * | 1665/2350/36.6"/16400' |

**FUEL**

| | | | |
|---|---|---|---|
| Cruise and normal | 92 | 92 | 92 |
| T.O./Mil./Combat | 92 & ADI | 92 & ADI | 92 |

**CHARACTERISTICS**

| | | | | | | |
|---|---|---|---|---|---|---|
| Fuel metering system | | 2 BBL. D.D. Float Carb. | | 2 BBL. D.D. Float Carb. | | 4 BBL. D.D. Float Carb. |
| Compression ratio | | 6.5 | | 6.5 | | 6.5 |
| Propeller ratio | | .578 | | .422 | | .500 (Farman type) |
| Supercharger | | 2 Speed | | 2 Speed | | 2 Speed |
| Ratio (s) | | 6.56 & 9.02 | | 7.04 & 9.64 | | |
| Imp. diam. | -mm. in. | 320 | 12.6" | 320 | 12.6" | 300 11.7" |
| Diameter | -mm. in. | 1400 | 55" | 1400 | 55" | 1350 53" |
| Bore/Stroke | -mm. in. | 155/170 | 6.1"/6.69" | 155/170 | 6.1"/6.69" | 150/170 5.91"/6.69" |
| Displace | - ltr. cu.in. | 44.9 | 2740 | 44.9 | 2740 | 54.1 3300 |
| Dry wt. | - kg. lbs. | 899 | 1990 | 899 | 1990 | 930 2046 |

**INSTALLED IN**

| | | | |
|---|---|---|---|
| Code name | JILL 11 | JILL 11 | |

**REMARKS**

See Page 892.

# ENGINES

**DESIGNATION**

| | | | |
|---|---|---|---|
| Model<br>Manufacturer | Mitsubishi | Mitsubishi | |
| Other designation | Ha 42 Model 11 (Ha 104) | Ha 42 Model 21 (MK10C) | Ha 35 Mod.32(Ha115Mod 2) |

**TYPE**

| | | | |
|---|---|---|---|
| Cylinder arrangement | Radial | Radial | Radial |
| Coolant | Air (Fan Assisted) | Air | Air |
| Number of cylinders | 18 | 18 | 14 |

**PERFORMANCE (HP/RPM/AMP/ALT)**

| | | | |
|---|---|---|---|
| Take-off | 1890/2450/40.5"/SL | | ( ) |
| W.E.P. | 1890/2450/40.5"/SL | | ( Probably ) |
| W.E.P. | 1985/2450/40.5"/6000' * | | ( same ) |
| W.E.P. | 1810/2450/40.5"/18700'* | | ( as ) |
| Military | 1660/2350/37"/SL | | ( Sakae 31 A ) |
| Military | 1775/2350/37"/7200 | | ( " ) |
| Military | 1640/2350/37"/20000 | | ( ) |

**FUEL**

| | | | |
|---|---|---|---|
| Cruise and normal | 87 | | 92 |
| T.O./Mil./Combat | 91 | | 92 |

**CHARACTERISTICS**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Fuel metering system | | 4 BBL. D.D. Carb. | | | | | 2 BBL. D.D. Carb. | |
| Compression ratio | | 6.5 | | | | | | |
| Propeller ratio | | .588 | | | | | .6875 | |
| Supercharger | | 2 speed | | | 2 speed | | 2 speed | |
| Ratio (s) | | 6.68 & 9.35 | | | | | 6.37 & 9.00 | |
| Imp. diam. | -mm. in. | 325 | 12.8" | | | | 305 | 12.0" |
| Diameter | -mm. in. | 1370 | 54" | 1350 | 53" | | 1150 | 45.3" |
| Bore/Stroke | -mm. in. | 150/170 | 5.91"/6.69" | 150/170 | 5.91"/6.69" | | 130/150 | 5.12"/5.91" |
| Displace | - ltr. cu.in. | 54.1 | 3300 | 54.1 | 3300 | | 27.9 | 1700 |
| Dry wt. | - kg. lbs. | 944 | 2080 | | | | | |

**INSTALLED IN**

| | | | |
|---|---|---|---|
| Code name | STEVE 1<br>CLARA 1<br>PEGGY 1 | | OSCAR 3 |

**REMARKS**

| | | | |
|---|---|---|---|
| | Army counterpart of MK6A. | Experimental designation of Army counterpart-Ha 214 Ru. | |

14 Cyl. RADIAL ENGINES - 130 mm. x 150 mm.

Type 99 - 950 hp (Ha 35, Model 12)

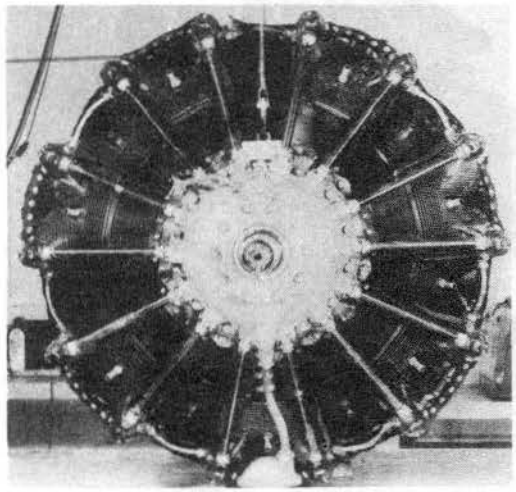


Fig. 1

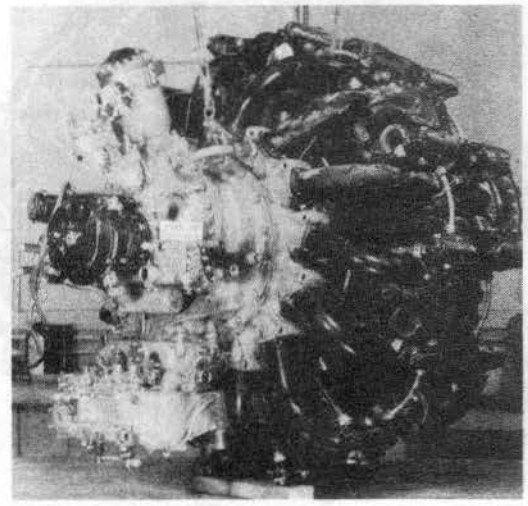


Fig. 2

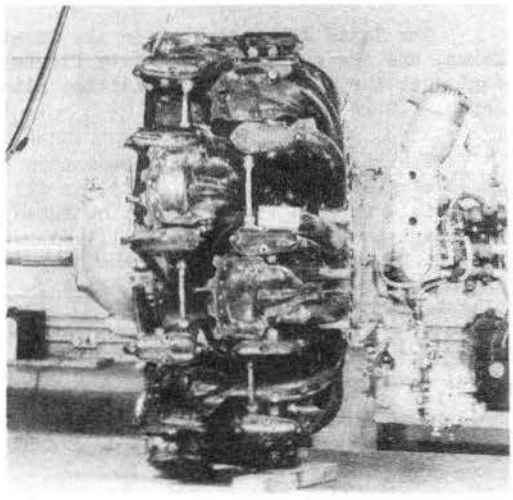


Fig. 3

While this engine has been given the same abbreviated designation as the Sakae 12, it differs slightly in structural details and altitude rating. It is the Army counterpart of the Sakae 12. Diameter - 45.3".

# ENGINES

Sakae 12 (Ha 35, Model 12)

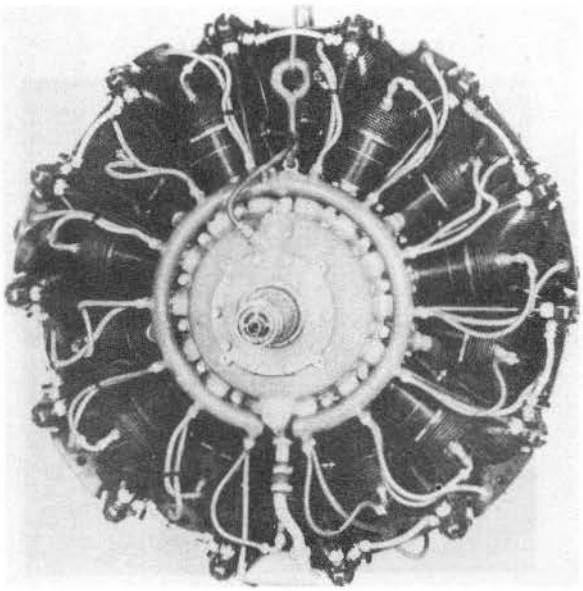


Fig. 4

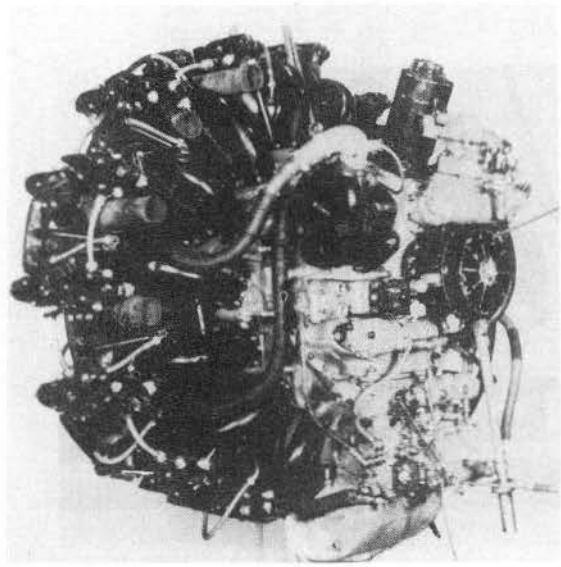


Fig. 5

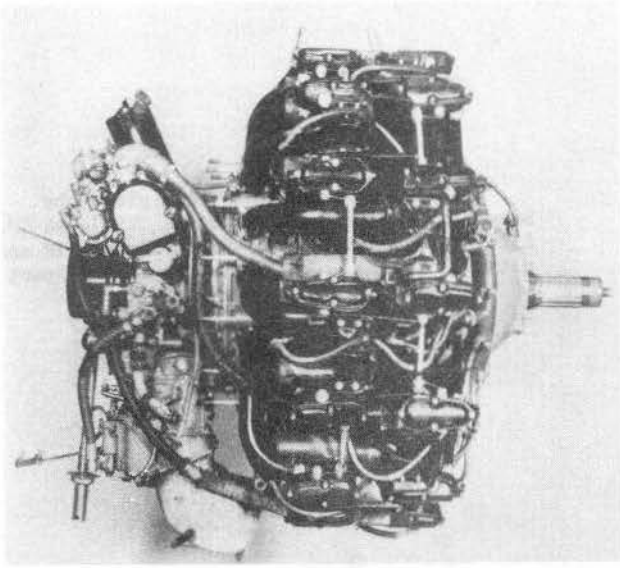


Fig. 6

The Sakae 12, installed in the first Zekes, was the most important Navy fighter engine at the outbreak of hostilities with Japan. It is now obsolescent.

The Sakae 11, the first production model of the Sakae "10" series is, in all essential respects, the same as the Sakae 12 except that it has a lower altitude rating. The "11" and "12" are the only known engines of the Sakae "10" series. Diameter - 45.3".

TYPE 2 1150 HP (Ha 35 Model 23)

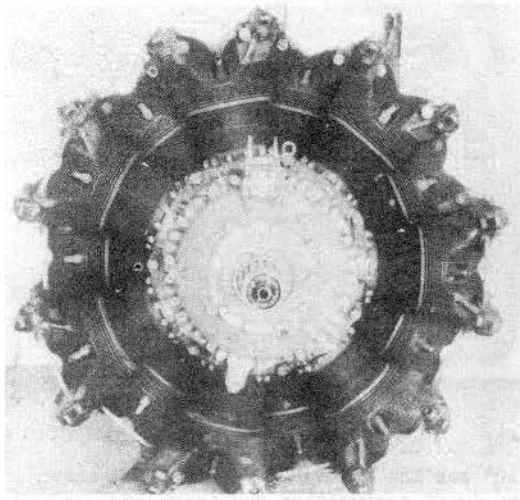


Fig. 7

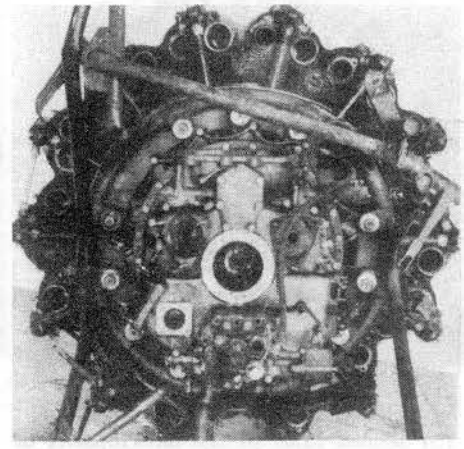


Fig. 8

The Type 2 1150 HP is the Army development of the type 99 950 HP in the same manner that the Sakae "20" series is the Navy development of the "10" series. It differs from the Sakae 21 by the shorter nose section and reduction gear which are the same as its predecessor, the Type 99 950 HP. Compare nose section with the Sakae 31 which is almost identical to the Sakae 21.

Front push rods, rocker box covers, induction pipes and accessories have been removed from the engine shown.

Diameter - 45.3".

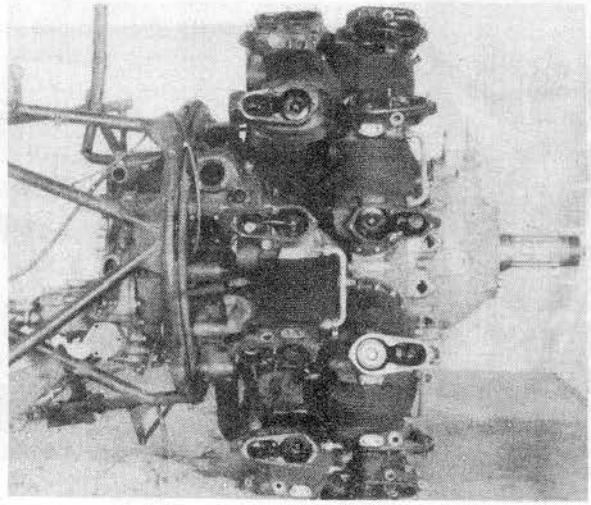


Fig. 9

Sakae 31 (Ha 35, Model 31)

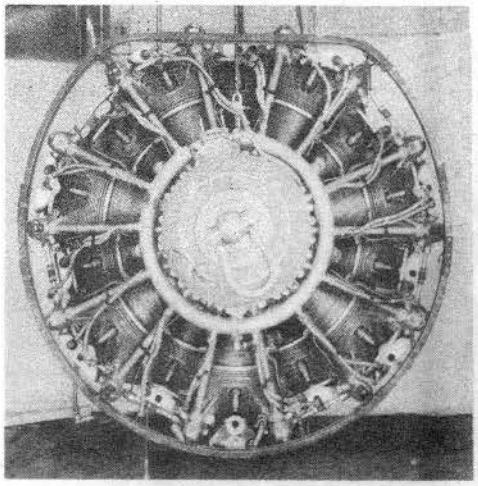


Fig. 10

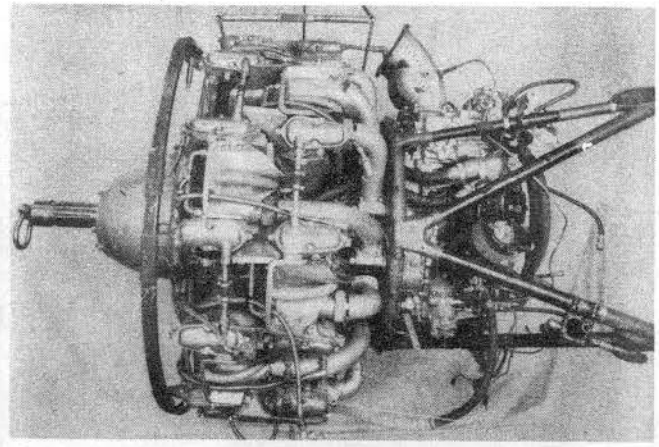


Fig. 11

The second link in the development of the Sakae "10" was the Sakae "20" series (not shown). Principal improvements were two speed supercharger, down draft carburetion and increased cooling area. The Sakae 21 and 22 are the only known engines of the "20" series, the 22 being the same as the 21 except for reversal of direction of propeller rotation.

The Sakae 31, the latest development of the Sakae engines, is subtantially the same as the Sakae 21 except that water-methanolinjection is used, valve timing has been changed and the second critical altitude increased slightly. It has a 10 minute war emergency rating when water injection is used.

A sub-model, the 31A, is the same as the 31 except that water injection is not used. Documents give its emergency rating as 1 minute.

Another sub-model, the 31B is the same as the 31 except that water injection is not used and supercharger characteristics are the same as the Sakae 31.

Diameter of Sakae 21 and 31 - 45.3".

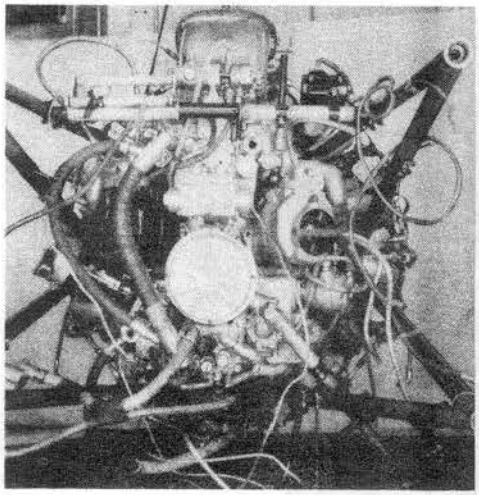


Fig. 12

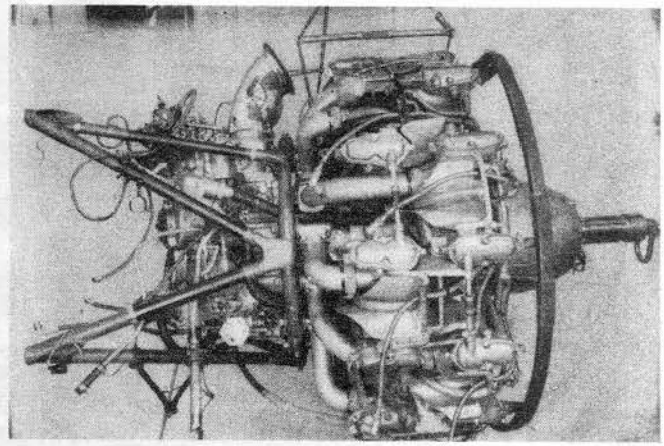


Fig. 13

14 Cyl. RADIAL ENGINES - 140 mm. x 130 mm.

Type 99 900 hp Model 2 (Ha 31, Model 15)

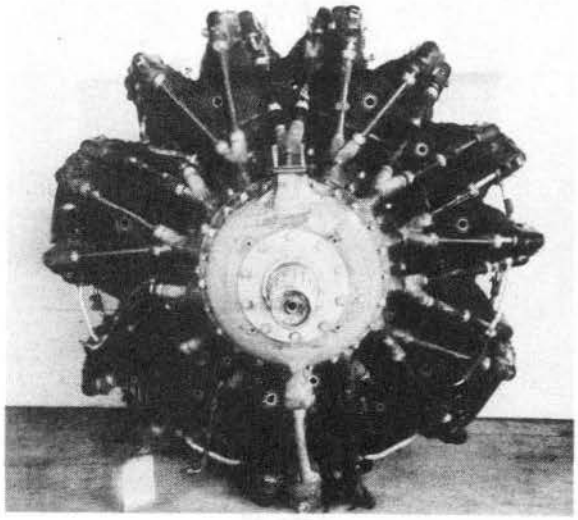


Fig. 14

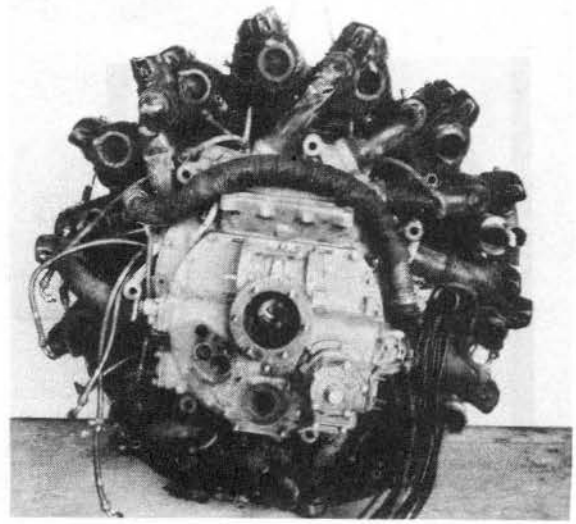


Fig. 15

This engine, together with its related engines, the Zuisei 13 and Type 1 1050 hp, are the only known operational engines having a bore/stroke ratio of less than unity, (.93). They are also the most compact 14 cylinder engines, having an overall diameter of only 44".

The Type 99 900 hp Model 2 is a development of the Model 1 which latter is believed to be the Army version of the Zuisei 13. The Model 1 has never appeared in operation. Both the Model 2 and Zuisef 13 are now obsolescent.

Diameter - 44".

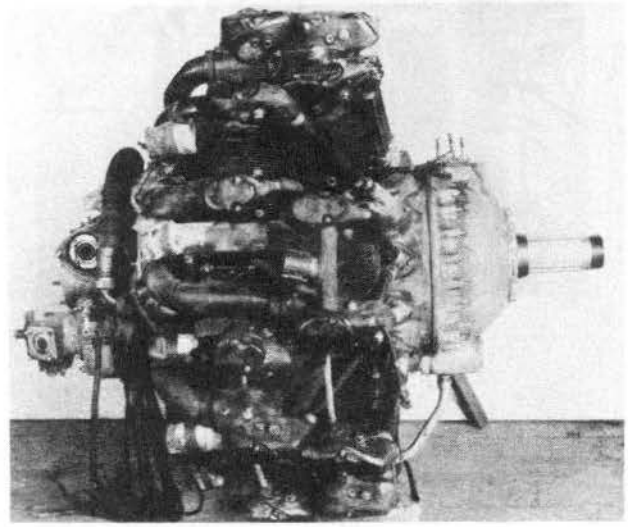


Fig. 16



620161 O—44——13

Type 1 1050 hp (Ha 31, Model 21)

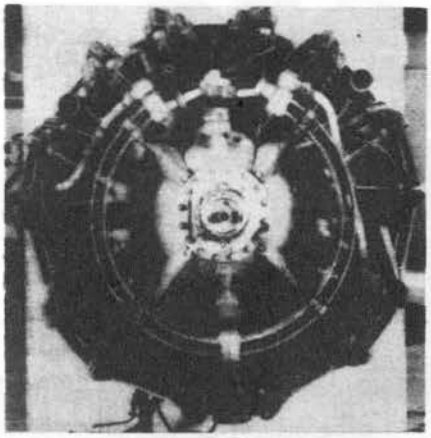


Fig. 17

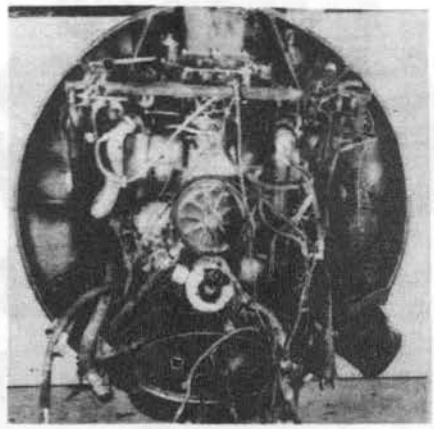


Fig. 18

The Type 1 1050 hp is a direct development of the Type 99 900 hp Model 2. The principal improvement is a two speed supercharger. It is still operational.

Diameter - 44".

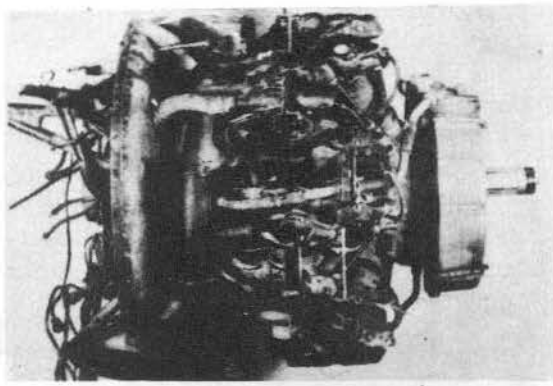


Fig. 19

14 Cyl. RADIAL ENGINES - 140 mm. x 150 mm.

Kinsei "40" series

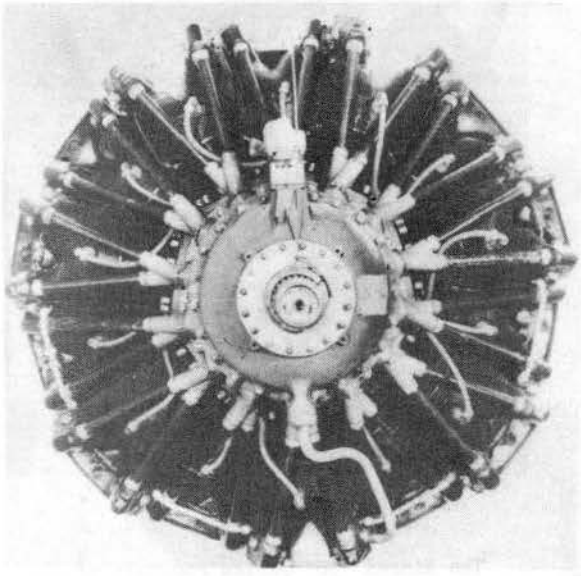


Fig. 20

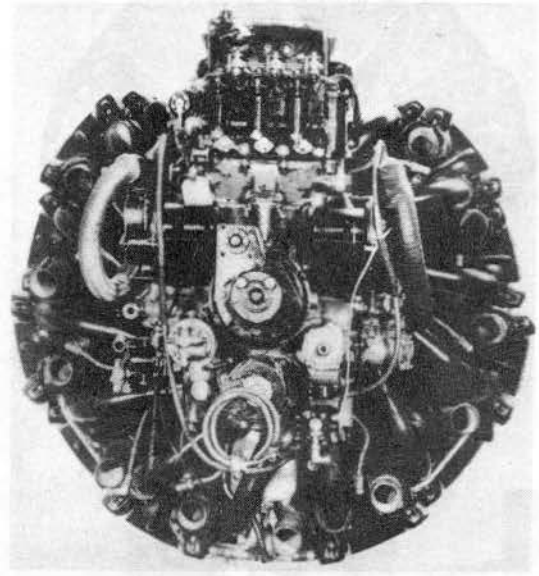


Fig. 21

Engines of this group include models 41 to 44 which are all identical except for accessories. Models 45 and 46 have improved altitude performance over models 41 to 44. All engines of this group are now obsolescent. The engine shown in the Kinsei 44.

Diameter - 48".

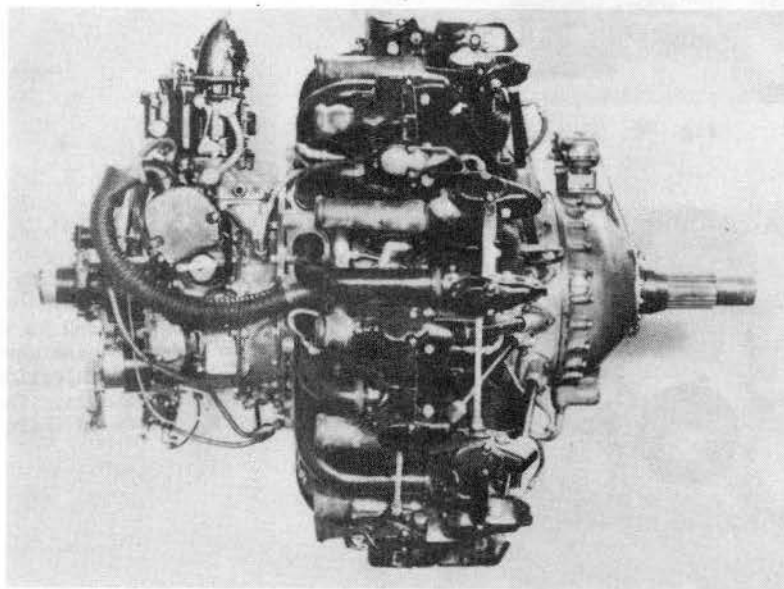


Fig. 22

## Kinsei "50" Series (Ha 33, Models 51 to 54)

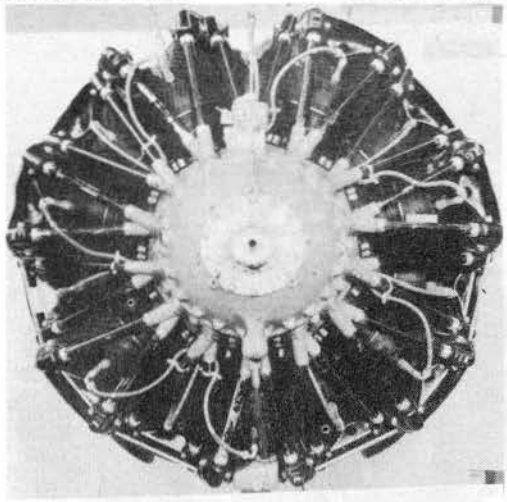


Fig. 23

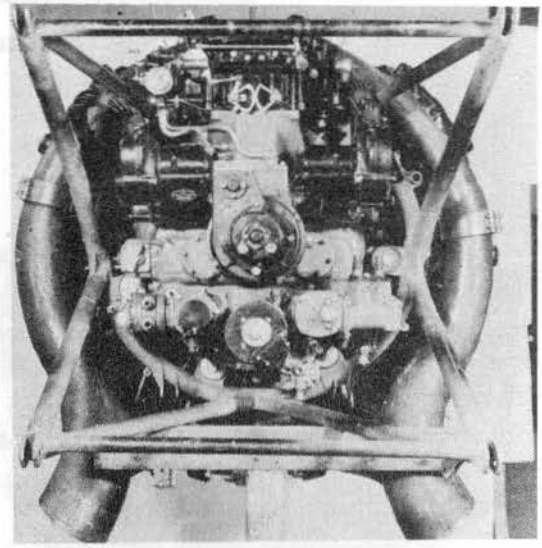


Fig. 24

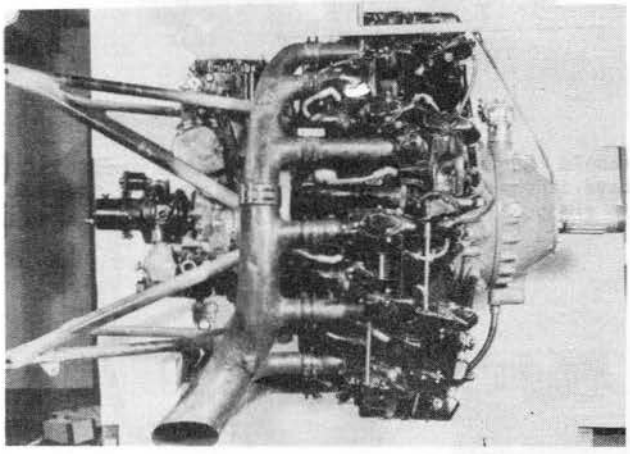


Fig. 25

The Kinsei "50" series consists of four models - 51 to 54 inclusive. All engines of this group are identical except for accessories. They are a direct development of the "40" series, the principal improvements being installation of a two speed supercharger, water injection system and redesigned cylinders. They are all operational. The engine shown is the 54. Diameter - 48".

## Ha 33 Model 62 (Ha 112 Model 2)

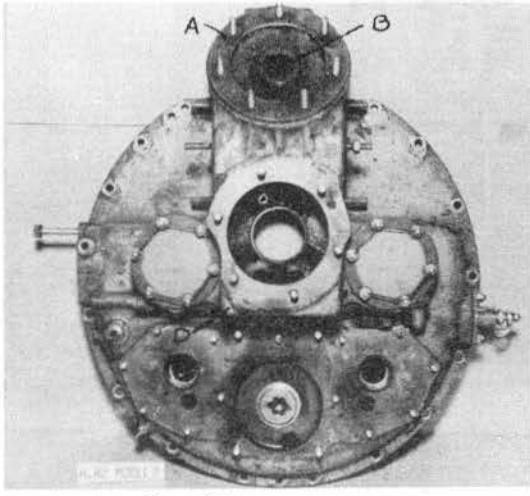



Fig. 26

The Ha 112, Model 2, is the only operational Japanese radial which uses a direct fuel injector and is identical to the Kinsei 50 series except for the rear case shown in Fig.13 , the installation of injection nozzles, and for a few minor details. The pump is mounted on flange A, driven by shaft B.

LIQUID-COOLED ENGINES - 150 mm. x 160 mm.

Atsuta 21 (Ha 60, Model 21)

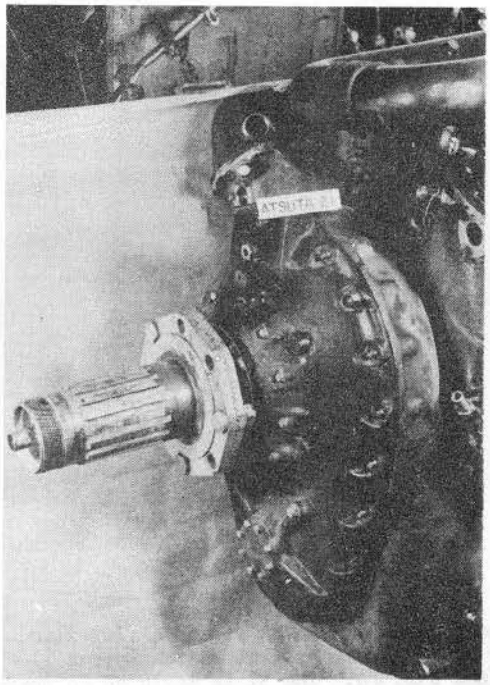


Fig. 27

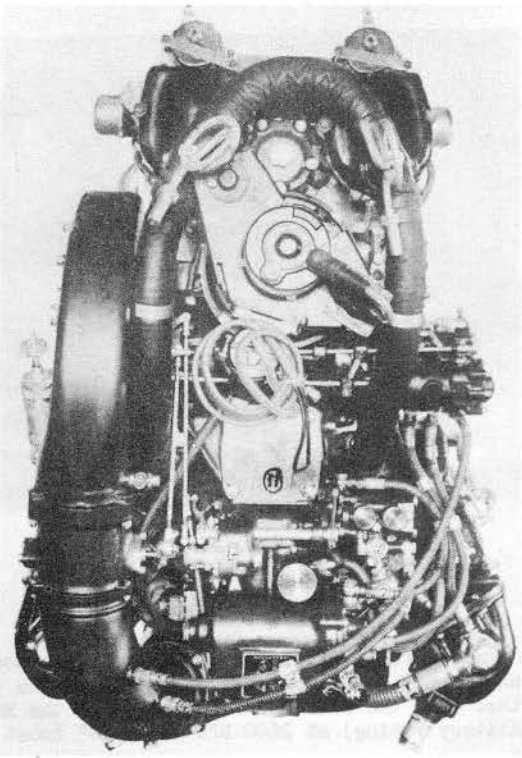


Fig. 28

The Atsuta 21 Navy engine, manufactured by Aichi, is a design copy of the German DB 601A with slight modifications.

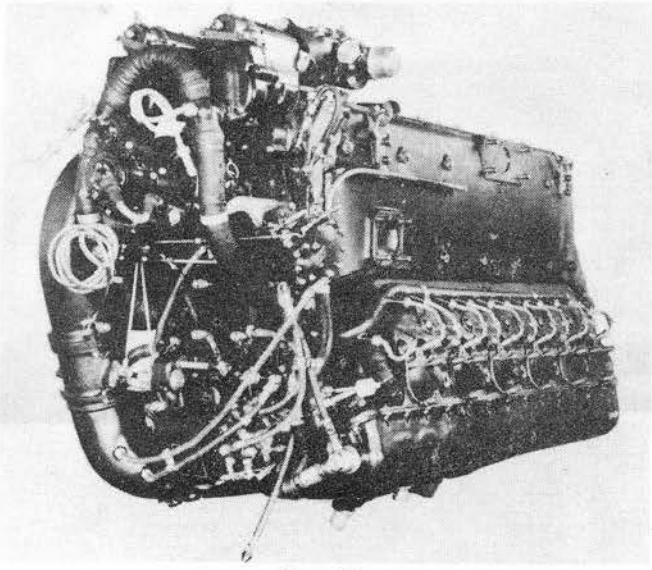


Fig. 29

Atsuta 31 (Ha 60 Model 31)

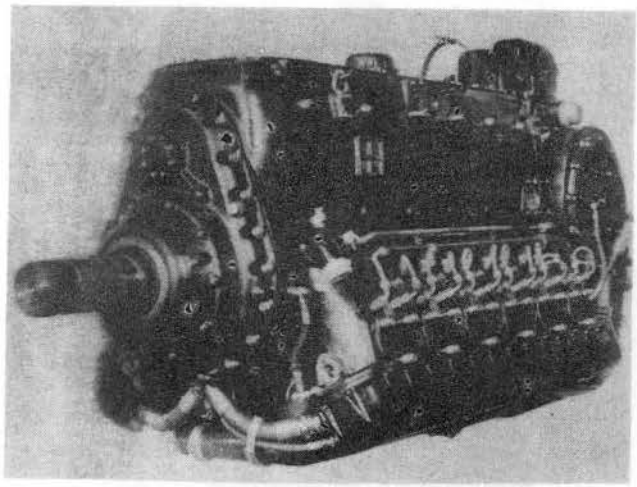


Fig. 30

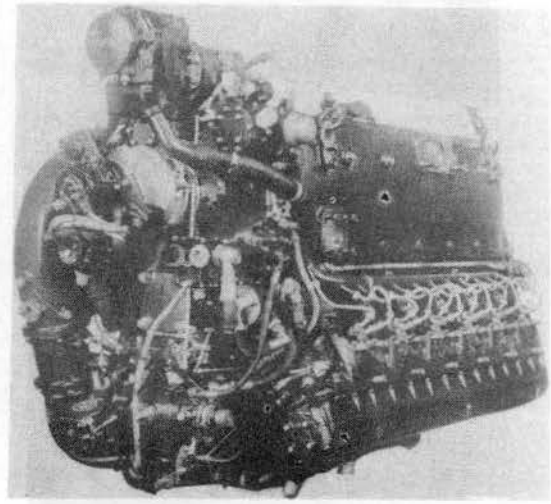


Fig. 31

All structural differeces between the Model 31 and 21 are unknown at present. Impeller diameter has been increased slightly and the propeller shaft resembles that of the Type 2 1100 hp rather than the serrated flange type of the Model 21 (See Fig. 27). The 31 is designed to operate (Military rating) at 2600 RPM and 39.8" boost in constrast to 2400 RPM and 35.8" for the 21.

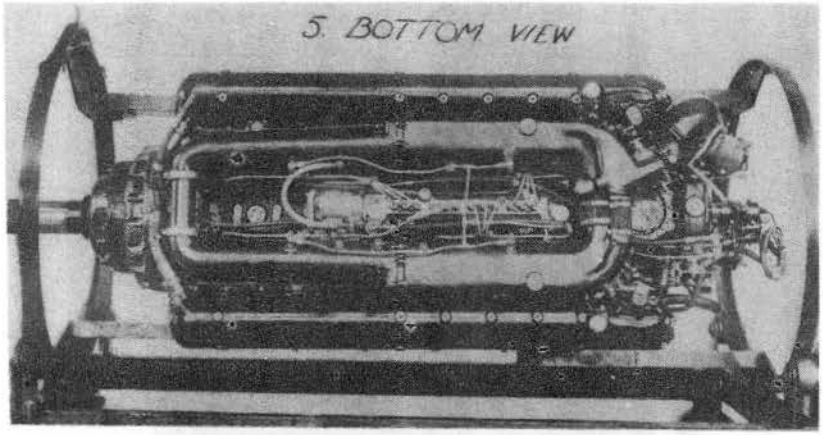



Fig. 32

Type 2 1100 hp (Ha 60, Model 22)

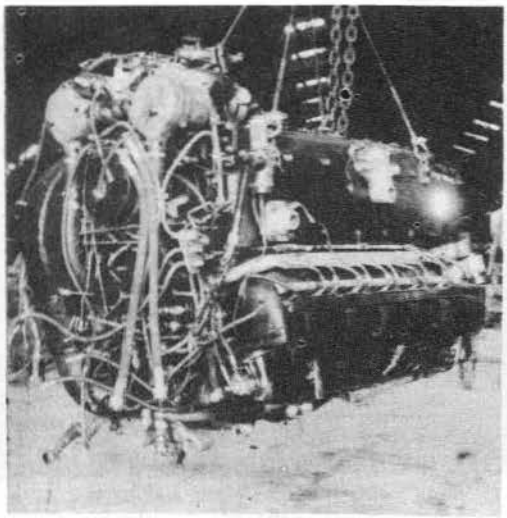


Fig. 33

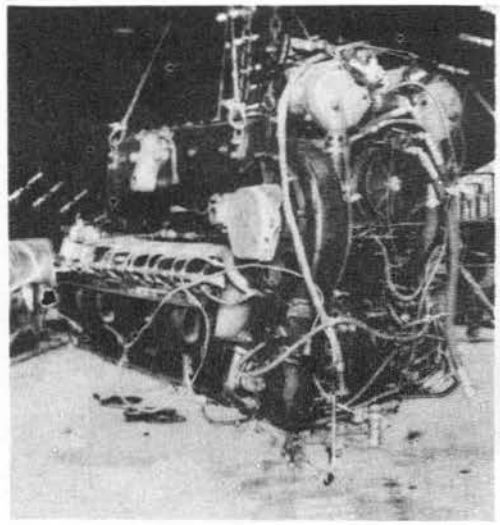


Fig. 34

The Type 2 1100 hp Army engine, manufactured by Kawasaki, is a design copy of the German DB 601A. A few Japanese features have been incorporated, notably the injection pump.

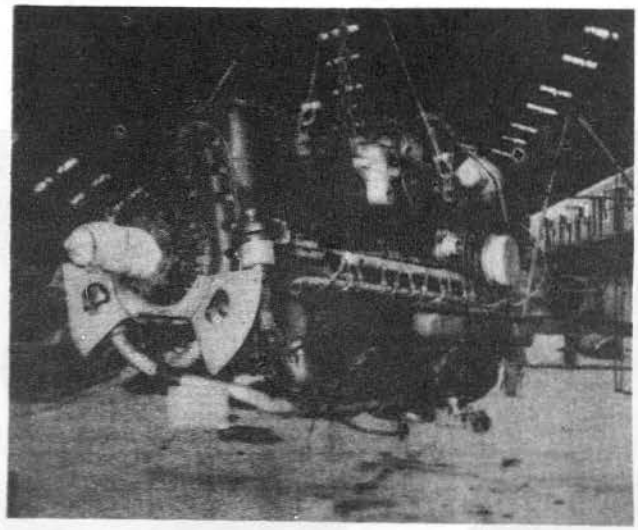


Fig. 35

# ENGINES

18 Cyl. RADIAL ENGINES - 130 mm.x 150 mm.

Homare 11 (Ha 45, Model 11)

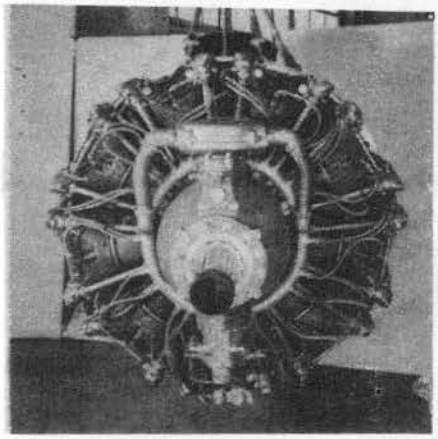


Fig. 36

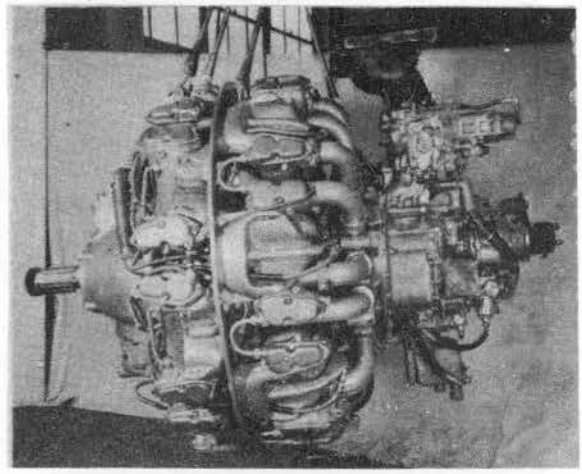


Fig. 37

This 18 cylinder engine is the first production model of the Homare series which is known to include models 11, 12, 21, 22 and 25. While its exact chain of development is not definitely known at present, it is probable that it is a direct development of the Sakae "10" series. Its Army counterpart, originally designated as the Ha 45 special, is, according to documentary evidence, a development of the Type 99 950 hp hence it seems reasonable that the Homare. a Navy engine, is a development of the Sakae.

The diameter of 46.5" represents an increase of only about 1" over the engine from which it developed. It is the most compact 18 cyl. Japanese engine and has the highest specific outputs Features found for the first time in Jap engines include steel crankcase, dynamic balancers, a dual magneto with remote distubutor on nose, and a nose sump with pump. Supercharger drive follows Wright design, having a planetary reduction gear in series with the high gear, for obtaining low ratio. It is equipped with water-methanol injection.

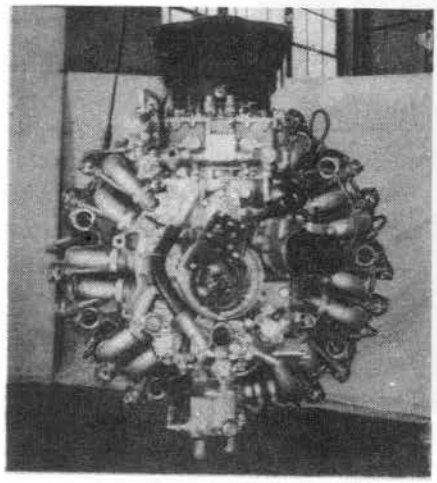


Fig. 38

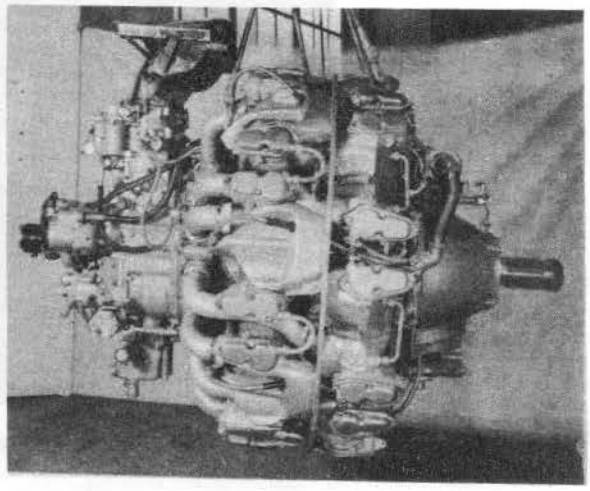


Fig. 39

Homare 21 (Ha 45 Model 21)

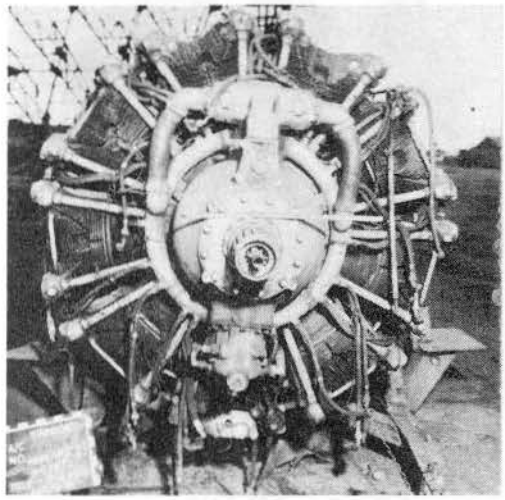


Fig. 40

Fig. 41

Principal changes over the Model 11 include considerable increased cooling fin area by reduction of fin pitch, increase of Take-off RPM and boost from 2900 and 45.7" to 3000 RPM and 49.6" respectively, with subsequent increase of power from 1795 to 1970.

An experimental version of the Homare 21 had cylinder finning similar to the Model 11 and was equipped with a cooling fan. In the operational embodiment the cooling fan has apparently been abandoned in favor of the closer finning.

Diameter - 46.5".

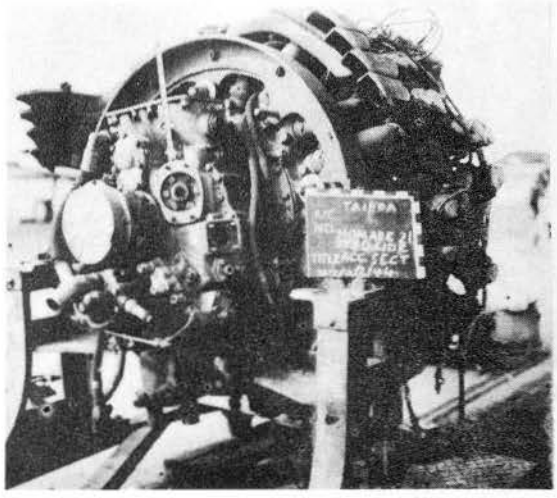


Fig. 42

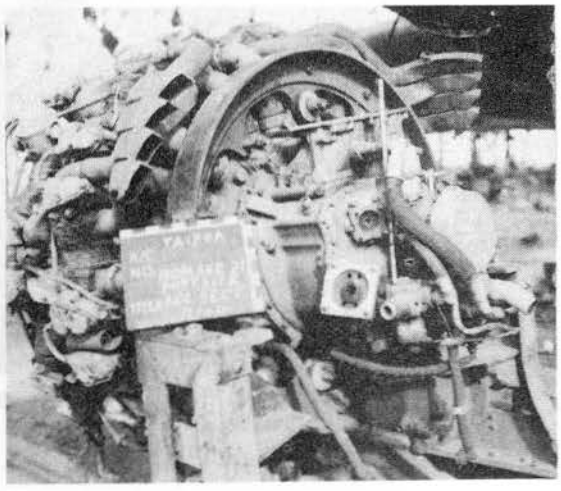


Fig. 43

# ENGINES

14 Cyl. RADIAL ENGINES - 146 mm. x 160 mm.
Type 2 1450 hp (Ha 34. Model 11)

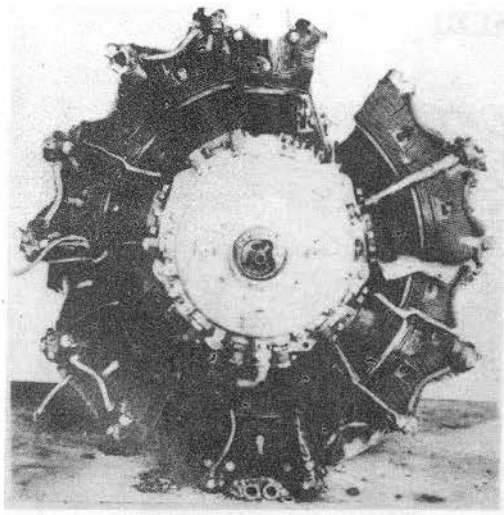


Fig. 44

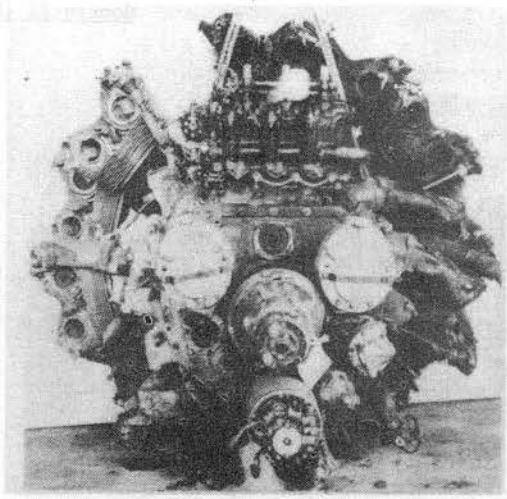


Fig. 45

The Type 2 1450 hp is the two speed version of the Type 100 1250 hp. Its principal feature is compactness. While only 49.7" in diameter as compared to 52.7" for the Kasei "10" series, it develops approximately the same power. It is still important operationally.

Push rods, rocker box covers, induction pipes and one cylinder have been removed from engine shown.

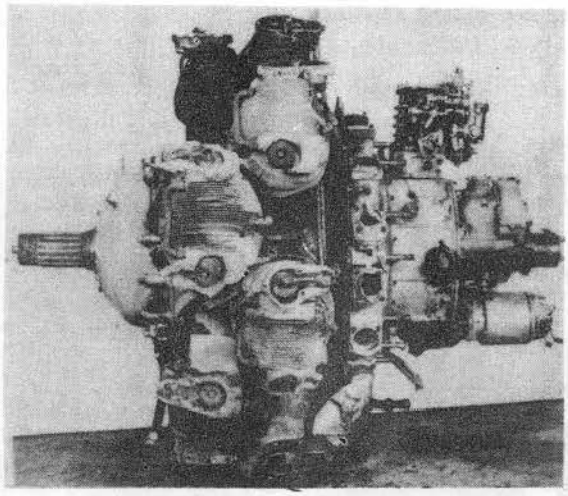


Fig. 46

14 Cyl. RADIAL ENGINES 150 mm. x 170 mm.

Kasei 11 (Ha 32, Model 11)

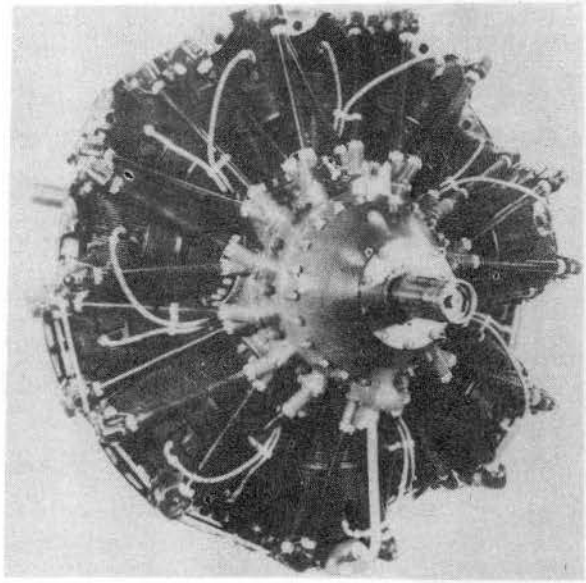


Fig. 47

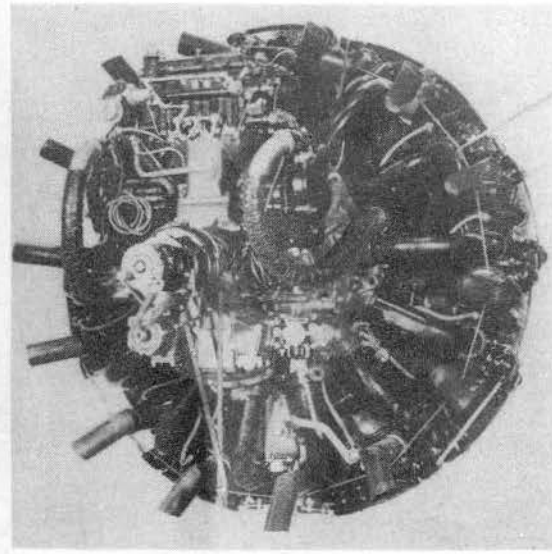


Fig. 48

The Kasei has been one of the most important 14 cylinder engines in the past and will probably remain as such for some time in the future. Engines of this series include the 11 to 15, inclusive, and 21 to 27, inclusive.

The 11 is the first production model of the Kasei series and is identical, except for minor modifications, to the Army Type 100 1,450 hp which latter is also designated as the Ha 32 Model 11. (Exhausts are not Japanese equipment).

The Kasei 12 is identical to the 11 except for reduction gear which is of Farman type with ratio of .5. Diameter of all Kasei's - 52.7".

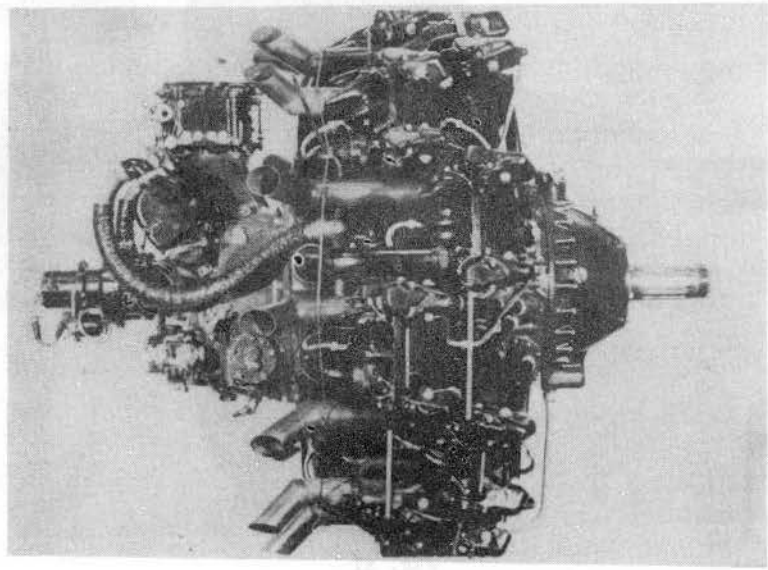


Fig. 49

# ENGINES

Kasei 13 (Ha 32, Model 13)

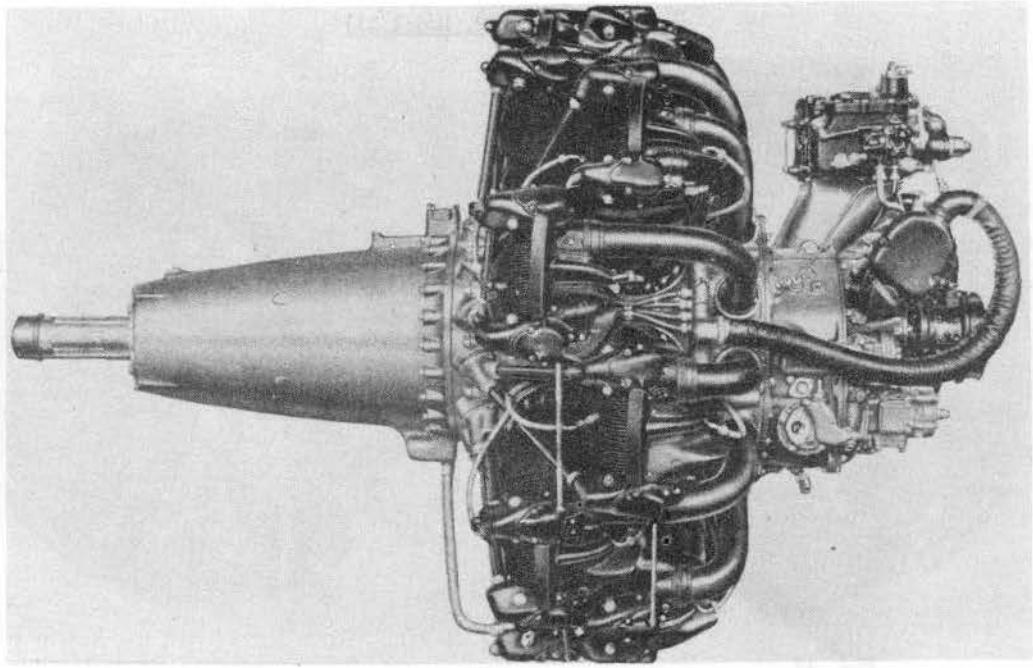


Fig. 50

The Kasei 13 to 15 are all substantially identical structurally except for changes in the nose section and reduction gear. All three of these engines have identical performance.

The 13 is unique for its extended nose feature.

Kasei 14 (Ha 32 Model 14)

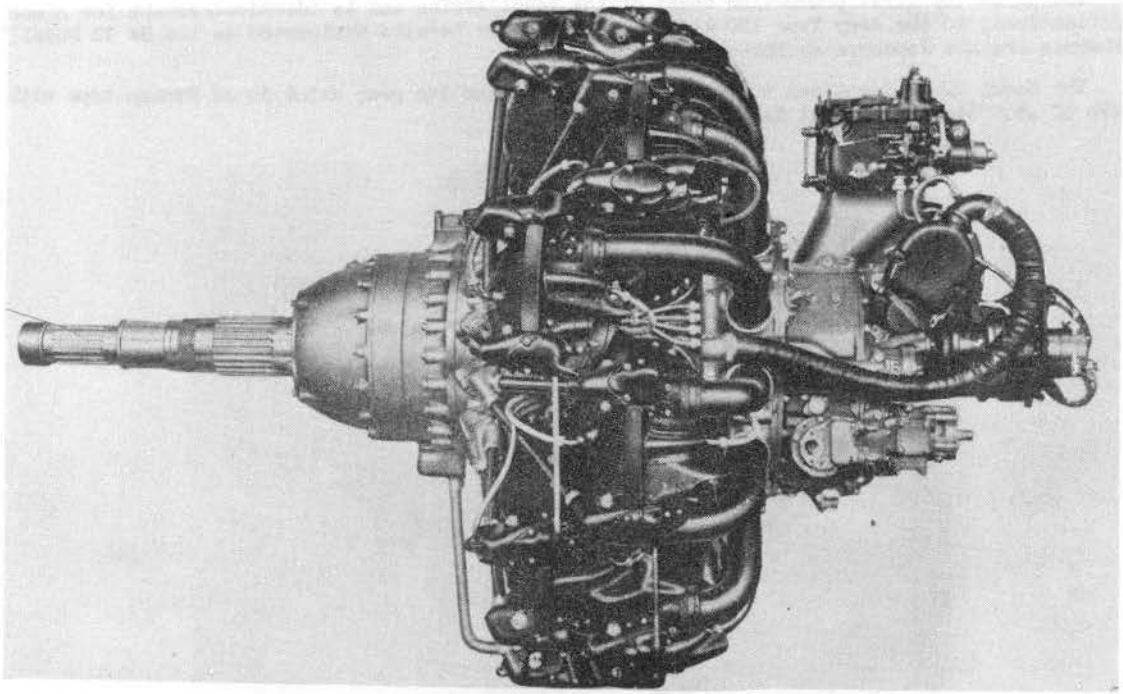


Fig. 51

This the first known Jap engine to incorporate contra-rotating propellers. It is quite likely that the same arrangement will be used in the Kasei 24, also a contra-rotating propeller engine.

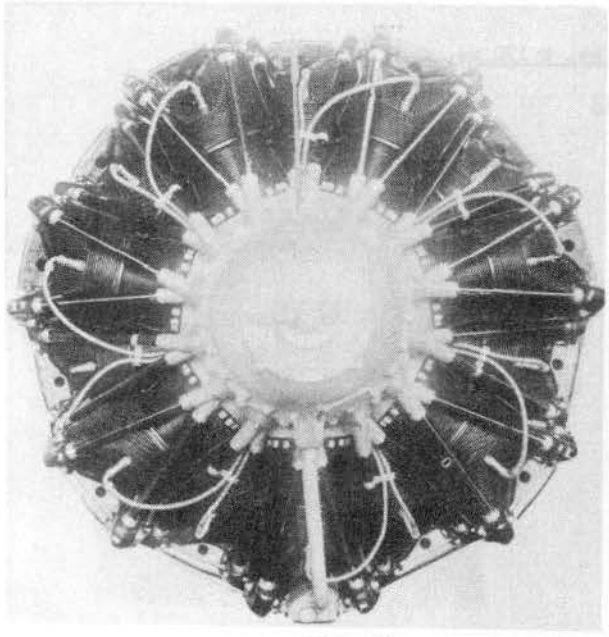


Fig. 52

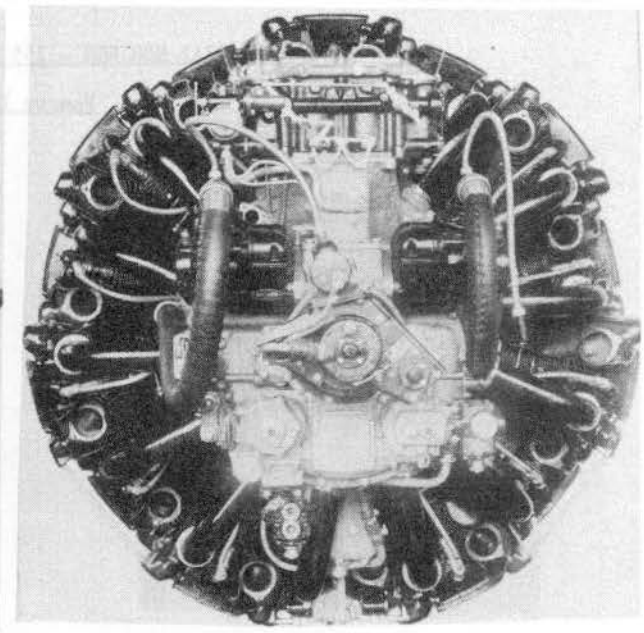


Fig. 53

The principal distinction between the Kasei "10" and "20" series is use of water injection equipment in the latter series. Engines of the "20" series vary principally in nose section and reduction gearing. The 23 is a direct fuel injection engine and the 26 is believed to be a direct fuel injection engine, also. The remainder of the 20 series use carburetors. The 24 has contra-rotating propellers.

Except for the differences above noted, the engine shown is typical of all of the 20 series.

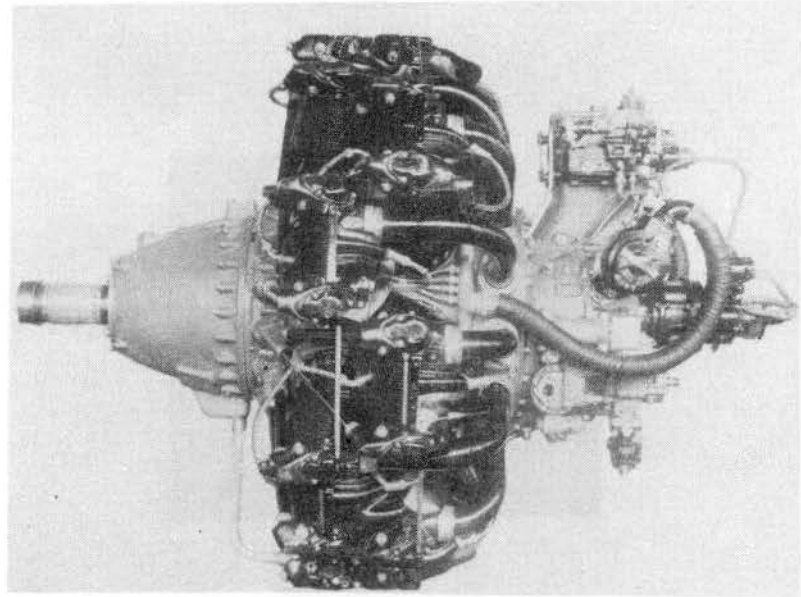


Fig. 54

# ENGINES

## 14 Cyl. RADIAL ENGINES - 155 mm. x 170 mm.

### Mamoru 11

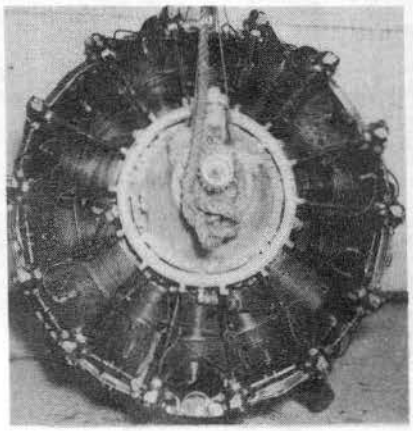


Fig. 55

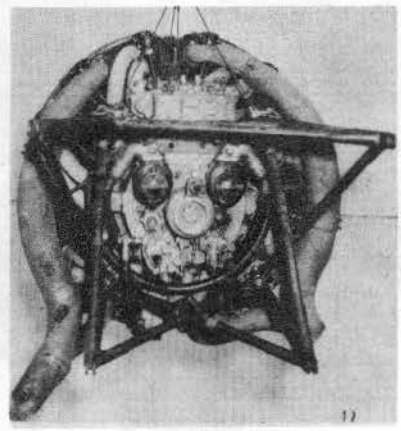


Fig. 56

The only known engines of this bore/stroke class are the Mamorus' which include models 11, 12, 21 and 22. They are the largest 14 cylinder radials having a displacement of 2740 cu. in. and overall diameter of 55".

While the Mamoru 11 is in limited use, its future development is somewhat questionable since several engines of equivalent power and of smaller diameter are now in production.

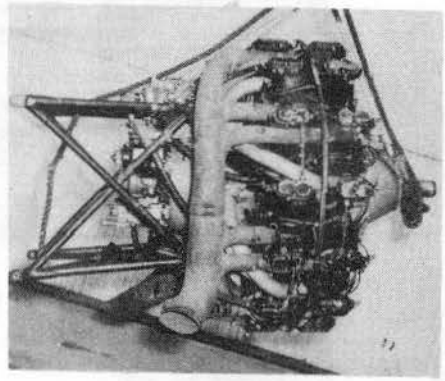


Fig. 57

18 Cyl. RADIAL ENGINES - 150 mm. x 170 mm.

Ha 42, Model 11, (MK6A)

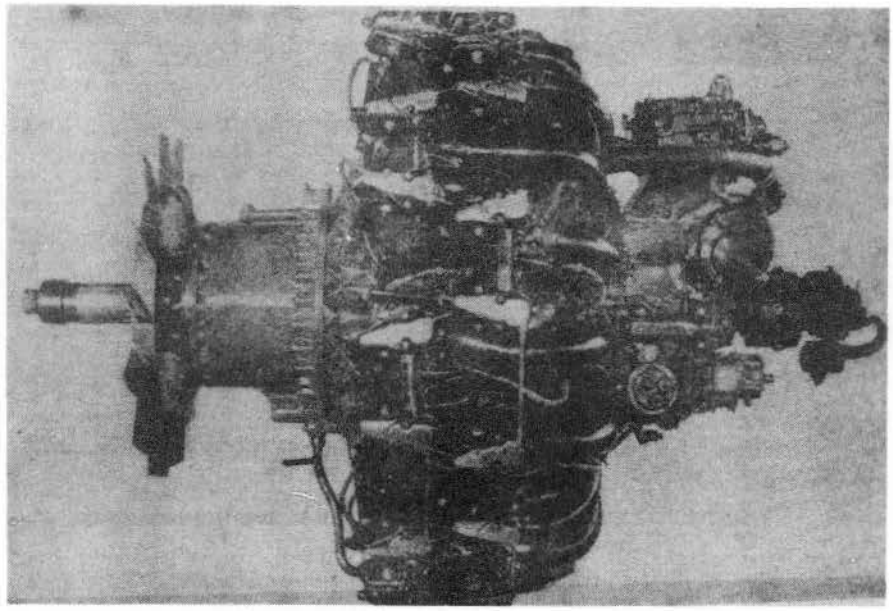


Fig. 58

The 18 cylinder engine shown above is the latest development of the Kasei 14 cylinder engines. It is the largest Japanese 18 cylinder radial, having a displacement of 3300 cu. in. It, together with its Army counterpart also designated as Ha 42 Model 11, (experimental designation Ha 104), are the only known operational engines which use cooling fans. The MK6A is expected to appear operationally in the near future. The Ha 104 recently appeared operationally.

Diameter - 53".

NOTES

## JAPANESE AIRCRAFT ARMAMENT

INTRODUCTION

The study of Japanese Aircraft Armament reveals a failure on their part to standardize on any one particular weapon for each caliber size. The two services, Army and Navy, have carried out separate development projects which have produced many different weapons requiring various types of ammunition.

The following pages show the various types of Aircraft Weapons which have been found. Those used by the Army are listed first and those used by the Naval Air Forces are listed last. In selecting the photographs to be used, an attempt has been made to show a side view of each gun and a top view with magazine drum attached.

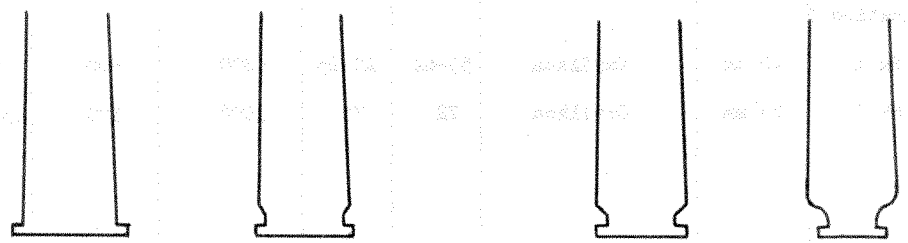
A few of the terms used should be explained to prevent a possible misinterpretation. First of all, the term, "Effective Range", has been used to give some idea of the comparative performance of each weapon. This figure was derived, not as a result of test, but by a comparison of muzzle velocities and projectile weights of Japanese Weapons with American Weapons of similar caliber. At best, this is an arbitrary figure, for many things will affect the Effective Range. Among them are the method of mounting the gun, the type of sight used, and even the degree of training the gunner has received.

No mention has been made of the sights used on each type of gun, for this varies with the way the gun is mounted. However, it can be said that all flexible mounts use ring and post or ring and Norman Vane sights and all turrets and fixed mounts use reflector sights. No lead computing sights have been recovered to date.

For each weapon, the overall length and weight have been given. In both cases, the figures have been given for the basic gun. In other words, all extra equipment such as solenoids, mounts, and sights have been removed before the gun was weighed or measured.

Each page carries a picture and a description of the various types of ammunition used with each weapon. The terms "Rimmed", "Semi-rimmed", "Rimless", and "Oerlikon" are used to differentiate between the various types of cartridge cases. Since the photographs do not reveal this distinction clearly, a sketch is shown below to illustrate these types.

Cartridge Case Types



Rimmed Semi-rimmed Rimless Oerlikon

In almost all Japanese aircraft ammunition, the Primer is composed of Mercury Fulminate, Potassium Chlorate, Antimony Sulphide, and Grit. The propellant in almost all cases is Graphited Nitrocellulose. The German 20 mm. ammunition uses Nitrocellulose, Nitroglycerine, and Diphenylamine.



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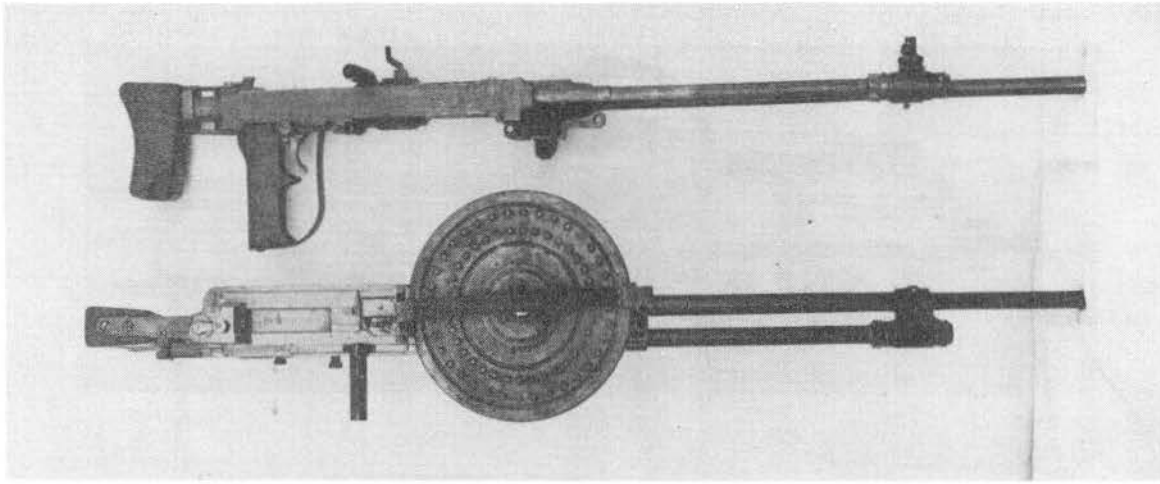
# ARMAMENT

## SUMMARY OF JAPANESE AIRCRAFT ARMAMENT

| Description | | | | Overall Length | Weight | Effective Range | Rate of Fire | Muzzle Velocity |
|---|---|---|---|---|---|---|---|---|
| Sheet No. | Type No. | Bore Diameter | Derivation | Inches | Lbs. | Yds. | Rds/Min. | Ft/Sec. |
| | | | **ARMY AIRCRAFT WEAPONS** | | | | | |
| 902 | Type 89 | 7.7 mm | Japanese ground machine gun | 42.5 | 20 | 600 | 750 | 2450 |
| 903 | Type 89 (Special) | 7.7 mm | Japanese ground machine gun | 38 | 65 | 600 | 1200 | 2450 |
| 904 | Type 89 Model 2 | 7.7 mm | Vickers Type | 40.5 | 26 | 600 | 850 | 2450 |
| 907 | Type 98 | 7.92 mm | German MG 15 | 42.5 | 15.5 | 600 | 1000 | 2800 |
| 909 | Type 1 or 100 | 7.92 mm | Bren Type | 37 | 35 | 600 | 1200 | 2800 |
| 912 | Type 1 | 12.7 mm | Browning | 49 | 48 | 800 | 900 | 2500 |
| 915 | Type 97 | 20 mm | Oerlikon | 69.5 | 72 | 1000 | 300 | 2500-2900 |
| 916 | MG 151/20 | 20 mm | German MG 151/20 | 69.5 | 92 | 800-1000 | 800 | 2500 |
| 917 | Type Ho 5 | 20 mm | Browning | 58 | 100 | - | - | - |
| 924 | Type 98 | 37 mm | French Field Gun | 54 | 269 | 1000 | 15-20 | 2000 |
| | | | **NAVAL AIRCRAFT WEAPONS** | | | | | |
| 931 | Type 92 | 7.7 mm | Lewis | 39 | 18.5 | 600 | 600 | 2500 |
| 932 | Type 97 Mod. 3 Modification 2 | 7.7 mm | Vickers | 41 | 27 | 600 | 850 | 2450 |
| 941 | Type 99 Mk 1 | 20 mm | Oerlikon | 53-62 | 47-65 | 800 | 500 | 2000 |
| 942 | Type 99 Mk 2 | 20 mm | Oerlikon | 72 | 75 | 1000 | 500 | 2500-2700 |

# ARMAMENT

## 7.7 mm Type 89 Gas Operated Machine Gun (Army)



### GENERAL

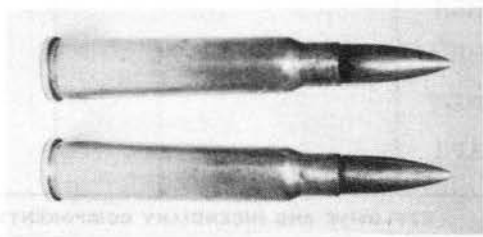
This weapon is a development of a light machine gun used by the Japanese ground forces. The 7.92 mm Type 98 machine gun replaced this weapon in most flexible positions.

### PERFORMANCE

| | |
|---|---|
| Rate of Fire (est.) | 750 rounds per minute |
| Muzzle Velocity (est.) | 2450 feet per second |
| Effective Range (est.) | 600 yards |

### CHARACTERISTICS

| | |
|---|---|
| Calibre | .303 inches (7.7 mm) |
| Overall Length | 42.5 inches |
| Weight of Gun | 20 pounds |
| Type of Feed | Flat Drum Magazine |
| Magazine Capacity | 69 rounds |
| Wt. Magazine Empty | 5.3 pounds |
| Wt. Magazine Full | 10.5 pounds |
| Wt. 100 Linked rds. | - |
| Charging System | Hand |
| Firing System | Hand-trigger |




A - Armor Piercing

B - Incendiary

The explosive round has a flat nose; all others are pointed like those above.

### AMMUNITION

| | |
|---|---|
| Overall Length | 3.15 inches |
| Case | Semi-rimmed |

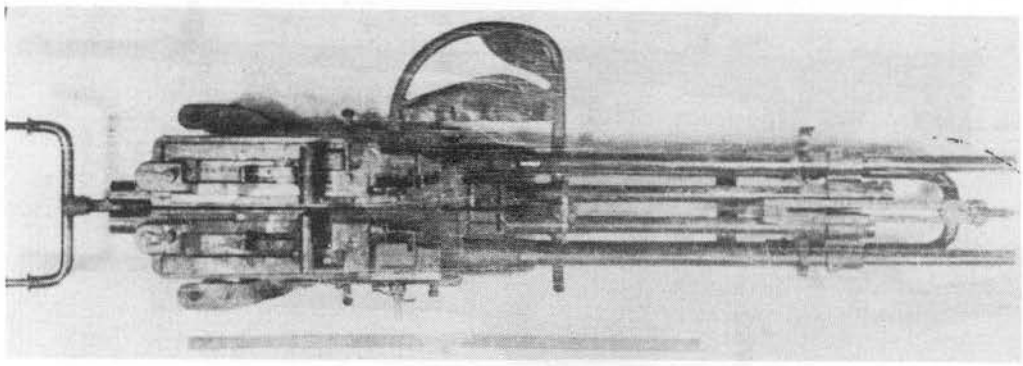
| TYPE | COLOR CODE | PROJECTILE WT. (Grams) |
|---|---|---|
| Ball | Red Band | 13.1 |
| AP | Black Band | 10.5 |
| Tracer | Green Band | 10.0 |
| Incend. | Wine Red Band | 10.6 |
| HE | Deep Purple Band | 10.7 |
| AP/T | | |
| HE/I | | |
| HE/AP | | |
| HE/T | | |
| AP/I | | |

### EXPLOSIVE AND INCENDIARY COMPONENTS

| TYPE | CONTENTS |
|---|---|
| Incend. | Phosphorous |
| HE | PETN |
| HE/I | |

# ARMAMENT

## 7.7 mm Type 89 (Special) Gas Operated Machine Gun (Army)



### GENERAL

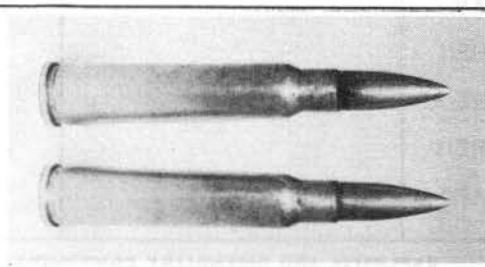
This is a development of the Type 89 gas operated gun shown on the previous page. A left and a right hand gun are mounted on a light tubular frame and fed by two quadrant shaped magazines.

### PERFORMANCE

| | |
|---|---|
| Rate of Fire (est.) | 1200 rounds per minute |
| Muzzle Velocity (est.) | 2450 feet per second |
| Effective Range (est.) | 600 yards |

### CHARACTERISTICS

| | |
|---|---|
| Calibre | .303 inches (7.7 mm) |
| Overall Length | 38 inches |
| Weight of Gun | 65 pounds |
| Type of Feed | Segment of Flat Drum Magazine |
| Magazine Capacity | 90 rounds per magazine |
| Wt. Magazine Empty | 6.75 pounds |
| Wt. Magazine Full | 12.0 pounds |
| Wt. 100 Linked rds. | - |
| Charging System | Hand |
| Firing System | Hand Trigger |




A - Armor Piercing

B - Incendiary

The explosive round has a flat nose; all others are pointed like those above.

### AMMUNITION

| | |
|---|---|
| Overall Length | 3.15 inches |
| Case | Semi-rimmed |

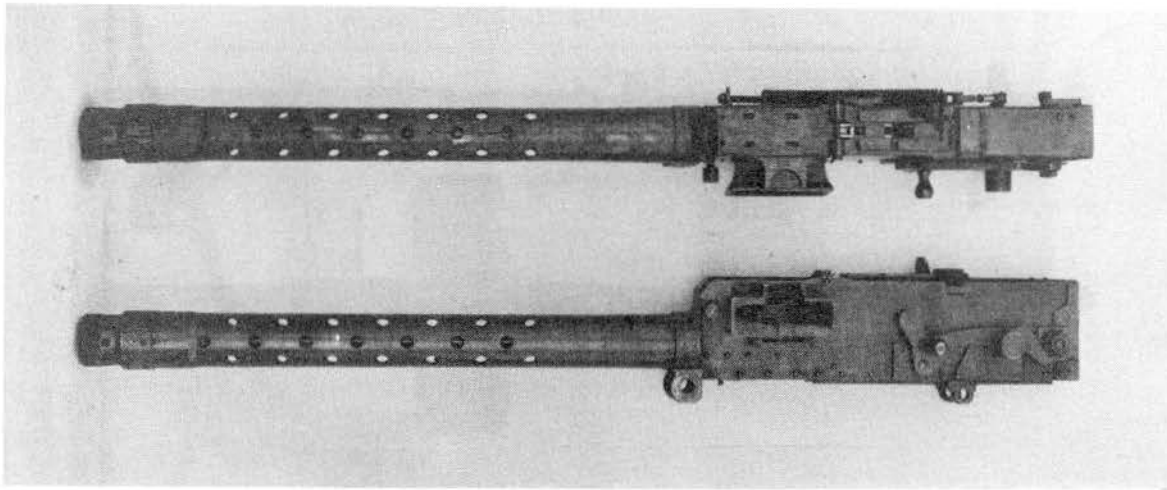
| TYPE | COLOR CODE | PROJECTILE WT. (Grams) |
|---|---|---|
| Ball | Red Band | 13.1 |
| AP | Black Band | 10.5 |
| Tracer | Green Band | 10.0 |
| Incend | Wine Red Band | 10.6 |
| HE | Deep Purple Band | 10.7 |
| AP/T | | |
| HE/I | | |
| HE/AP | | |
| HE/T | | |
| AP/I | | |

### EXPLOSIVE AND INCENDIARY COMPONENTS

| TYPE | CONTENTS |
|---|---|
| Incend. | Phosphorous |
| HE | PETN |
| HE/I | |

# ARMAMENT

## 7.7 mm Type 89 Model 2 (Vickers) Machine Gun (Army)



### GENERAL

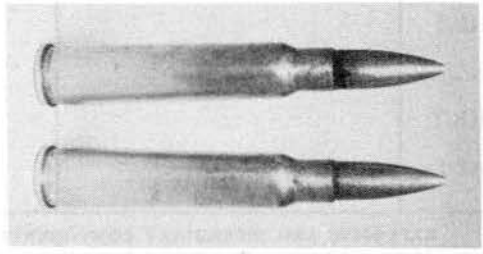
This Army weapon is basically the same as the Type 97 which is used by the Navy. Though the caliber of the two weapons is the same, ammunition for one cannot be used in the other. The Army Type 89 uses semi-rimmed ammunition and the Navy Type 97 uses rimmed ammunition.

### PERFORMANCE

| | |
|---|---|
| Rate of Fire (est.) | 850 rounds per minute |
| Muzzle Velocity (est.) | 2450 feet per second |
| Effective Range (est.) | 600 yards |

### CHARACTERISTICS

| | |
|---|---|
| Calibre | .303 inches (7.7 mm) |
| Overall Length | 40.5 inches |
| Weight of Gun | 26 pounds |
| Type of Feed | Disintegrating Metal Link Belt |
| Magazine Capacity | - |
| Wt. Magazine Empty | - |
| Wt. Magazine Full | - |
| Wt. 100 Linked rds. | 8 pounds |
| Charging System | Hand-lever or Cable |
| Firing System | Mechanical |



A

B

A - Armor Piercing
B - Incendiary

The explosive round has a flat nose; all others are pointed like those above.

### AMMUNITION

| | |
|---|---|
| Overall Length | 3.15 inches |
| Case | Semi-rimmed |

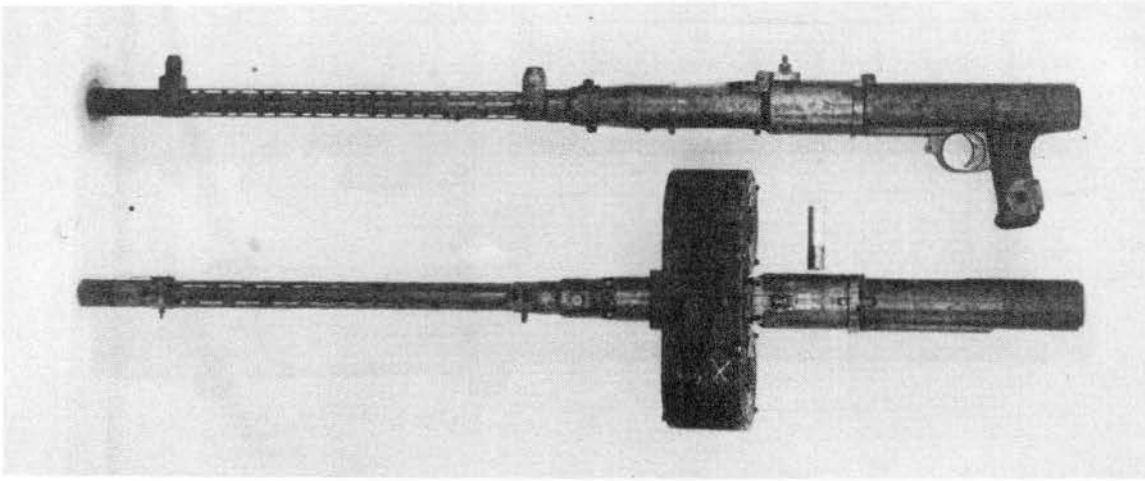
| TYPE | COLOR CODE | PROJECTILE WT. (Grams) |
|---|---|---|
| Ball | Red Band | 13.1 |
| AP | Black Band | 10.5 |
| Tracer | Green Band | 10.0 |
| Incend. | Wine Red Band | 10.6 |
| HE | Deep Purple Band | 10.7 |
| AP/T | | |
| HE/I | | |
| HE/AP | | |
| HE/T | | |
| AP/I | | |

### EXPLOSIVE AND INCENDIARY COMPONENTS

| TYPE | CONTENTS |
|---|---|
| Incend. | Phosphorous |
| HE | PETN |
| HE/I | |

# ARMAMENT

7.92 mm Type 98 (German MG 15) Machine Gun (Army)



## GENERAL

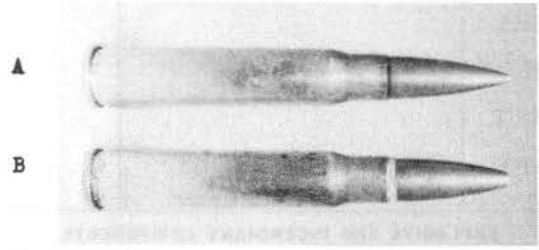
This weapon is a Japanese copy of the German MG 15. Because of its high rate of fire, it has been widely used as a flexible weapon in Army planes.

### PERFORMANCE

| | |
|---|---|
| Rate of Fire (est.) | 1000 rounds per minute |
| Muzzle Velocity (est.) | 2800 feet per second |
| Effective Range (est.) | 600 yards |

### CHARACTERISTICS

| | |
|---|---|
| Calibre | .312 inches (7.92 mm) |
| Overall Length | 42.5 inches |
| Weight of Gun | 15.5 pounds |
| Type of Feed | Saddle Drum Magazine |
| Magazine Capacity | 75 rds. (total in both drums) |
| Wt. Magazine Empty | 5.5 pounds |
| Wt. Magazine Full | 10.0 pounds |
| Wt. 100 Linked rds. | - |
| Charging System | Hand |
| Firing System | Hand-trigger |




A - Incendiary ( Pointed Nose)

B - High Explosive (Flat Nose)

### AMMUNITION

| | |
|---|---|
| Overall Length | 3.15 inches |
| Case | Rimless |

| TYPE | COLOR CODE | PROJECTILE WT. (Grams) |
|---|---|---|
| Ball | | |
| AP | Black Band | 11.6 |
| Tracer | | |
| Incend. | Red Band | 9.3 |
| HE | White Band | 11.64 |
| AP/T | | |
| HE/I | | |
| HE/AP | | |
| HE/T | | |
| AP/I | | |

### EXPLOSIVE AND INCENDIARY COMPONENTS

| TYPE | CONTENTS |
|---|---|
| Incend. | Phosphorous |
| HE | PETN |
| HE/I | |



DATE December 1944

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## GENERAL

**PERFORMANCE**

Rate of Fire (est.)
Muzzle Velocity (est.)
Effective Range (est.)

**CHARACTERISTICS**

Calibre
Overall Length
Weight of Gun
Type of Feed

Magazine Capacity
Wt. Magazine Empty
Wt. Magazine Full
Wt. 100 Linked rds.
Charging System
Firing System

**AMMUNITION**

Overall Length
Case

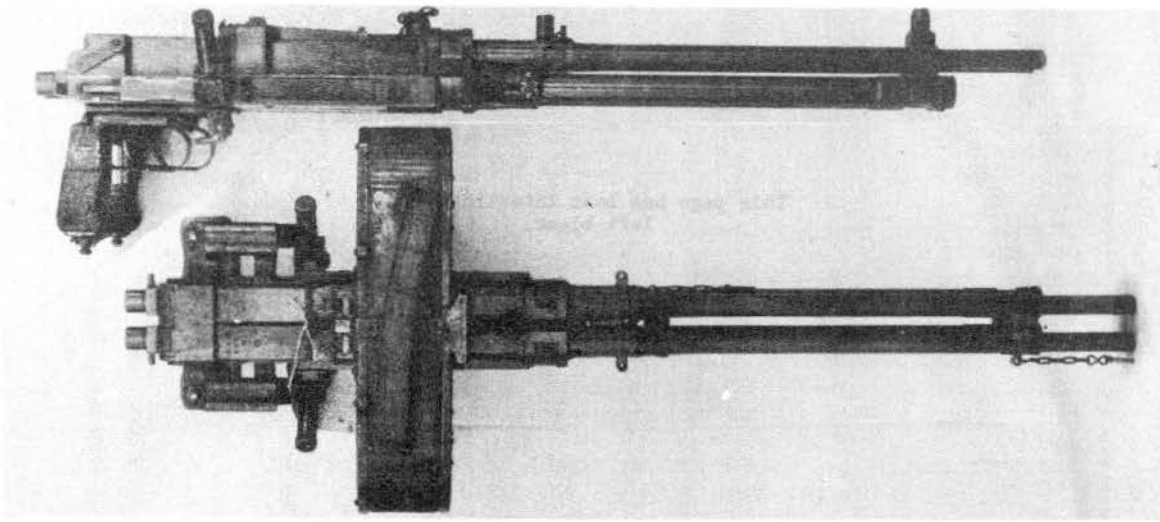
| TYPE | COLOR CODE | PROJECTILE WT. (Grams) |
|---|---|---|
| Ball | | |
| AP | | |
| Tracer | | |
| Incend. | | |
| HE | | |
| AP/T | | |
| HE/I | | |
| HE/AP | | |
| HE/T | | |
| AP/I | | |

**EXPLOSIVE AND INCENDIARY COMPONENTS**

| TYPE | CONTENTS |
|---|---|
| Incend. | |
| HE | |
| HE/I | |

# ARMAMENT

7.92 mm Type 1 (Type 100) Double-barrel Machine Gun (Army)



## GENERAL

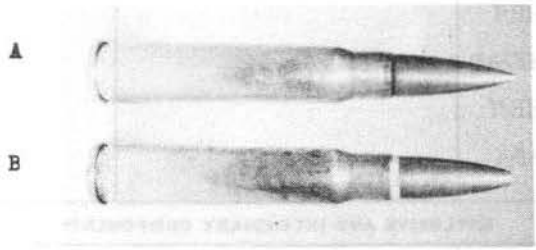
This double-barrel machine gun is so designed that either unit can function independently of the other in case a jam occurs. This weapon has been found designated as Type 1 or as Type 100. No difference between the two types has been noted.

### PERFORMANCE

| | |
|---|---|
| Rate of Fire (est.) | 1200 rounds per minute |
| Muzzle Velocity (est.) | 2800 feet per second |
| Effective Range (est.) | 600 yards |

### CHARACTERISTICS

| | |
|---|---|
| Calibre | .312 inches (7.92 mm) |
| Overall Length | 37 inches |
| Weight of Gun | 35 pounds |
| Type of Feed | Saddle Drum Magazine |
| Magazine Capacity | 100 rds. (total in both drums) |
| Wt. Magazine Empty | 7.8 pounds |
| Wt. Magazine Full | 13.8 pounds |
| Wt. 100 Linked rds. | - |
| Charging System | Hand |
| Firing System | Hand-trigger |




A - Incendiary (Pointed Nose)

B - High Explosive (Flat Nose)

### AMMUNITION

| | |
|---|---|
| Overall Length | 3.15 inches |
| Case | Rimless |

| TYPE | COLOR CODE | PROJECTILE WT. (Grams) |
|---|---|---|
| Ball | | |
| AP | Black band | 11.6 |
| Tracer | | |
| Incend. | Red band | 9.3 |
| HE | White band | 11.64 |
| AP/T | | |
| HE/I | | |
| HE/AP | | |
| HE/T | | |
| AP/I | | |

### EXPLOSIVE AND INCENDIARY COMPONENTS

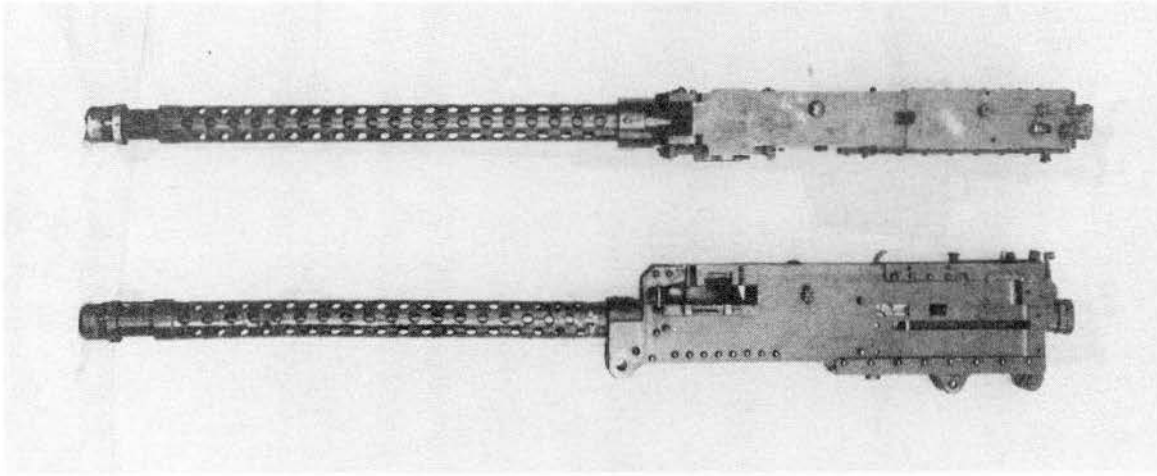
| TYPE | CONTENTS |
|---|---|
| Incend. | Phosphorous |
| HE | PETN |
| HE/I | |



DATE December 1944

# ARMAMENT

## 12.7 mm Type 1 (Browning) Machine Gun (Army)



### GENERAL

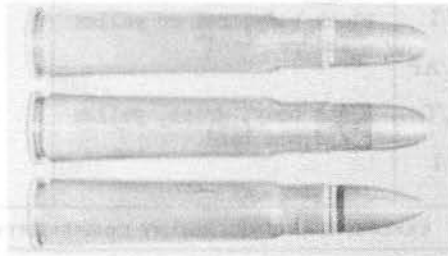
This weapon, with minor differences, is the same as an early model of the U.S. .50 caliber Browning machine gun. The feed is not interchangeable from left to right.

### PERFORMANCE

| | |
|---|---|
| Rate of Fire (est.) | 900 rounds per minute |
| Muzzle Velocity (est.) | 2500 feet per second |
| Effective Range (est.) | 800 yards |

### CHARACTERISTICS

| | |
|---|---|
| Calibre | .50 inches (12.7 mm) |
| Overall Length | 49 inches |
| Weight of Gun | 48 pounds |
| Type of Feed | Disintegrating Metal Link Belt |
| Magazine Capacity | - |
| Wt. Magazine Empty | - |
| Wt. Magazine Full | - |
| Wt. 100 Linked rds. | 20 pounds |
| Charging System | Manual or Hydraulic |
| Firing System | Electrical |




A - HE
B - HE/I (Italian manufacture)
C - AP/T

### AMMUNITION

| | |
|---|---|
| Overall Length | 4.18 inches |
| Case | Semi-rimmed |

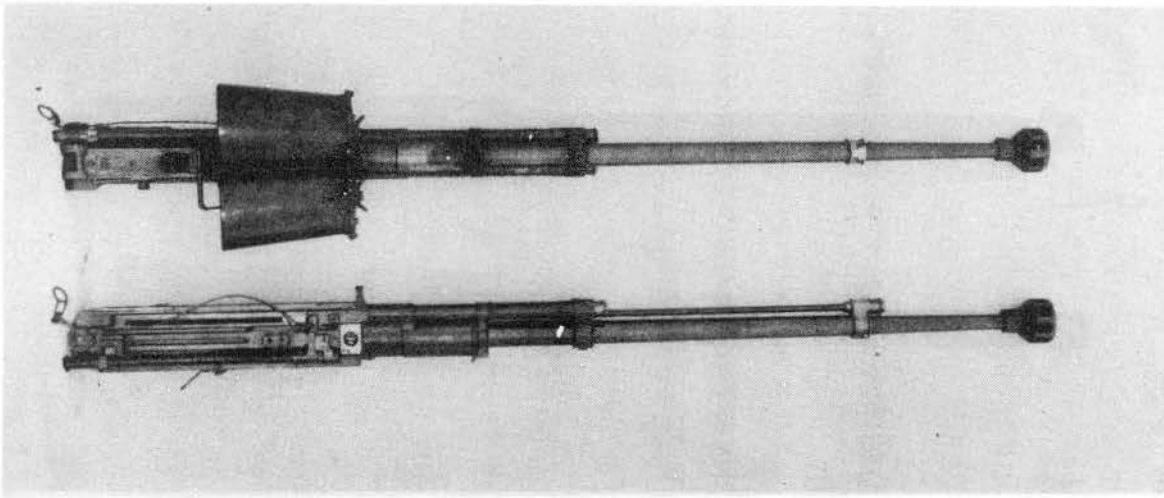
| TYPE | COLOR CODE | PROJECTILE WT. (Grams) |
|---|---|---|
| Ball | Red band | 35.98 |
| AP | | |
| Tracer | | |
| Incend. | | |
| HE | White band | 35.40 |
| AP/T | Green and white or black band | 36.8 |
| HE/I | Red, blue or green body, or deep purple (Black) band | 39.1 |
| HE/AP | | |
| HE/T | | |
| AP/I | | |

### EXPLOSIVE AND INCENDIARY COMPONENTS

| TYPE | CONTENTS |
|---|---|
| Incend. | Aluminum, Potassium Chlorate, and organic matter |
| HE | PETN |
| HE/I | |

# ARMAMENT

20 mm Type 97 (Gas Operated) Aircraft Cannon (Army)



## GENERAL

This weapon is believed to have a high muzzle velocity but its effectiveness is reduced by its slow rate of fire. It is an adaptation of a Japanese anti-tank weapon.

### PERFORMANCE

| | |
|---|---|
| Rate of Fire (est.) | 300 rounds per minute |
| Muzzle Velocity (est.) | 2500-2900 feet per second |
| Effective Range (est.) | 1000 yards |

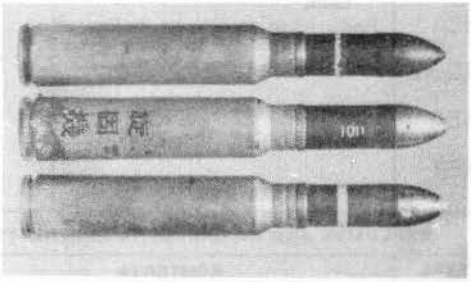
### CHARACTERISTICS

| | |
|---|---|
| Calibre | .79 inches (20 mm) |
| Overall Length | 69.5 inches |
| Weight of Gun | 72 pounds |
| Type of Feed | Inverted Saddle Drum Magazine |
| Magazine Capacity | (a) 15 rds. (b) 50 rds. |
| Wt. Magazine Empty | 12 lbs. Unknown |
| Wt. Magazine Full | 20 lbs. Unknown |
| Wt. 100 Linked rds. | - |
| Charging System | Hand-cable |
| Firing System | Electrical or Manual |

A

B

C



A - Armor Piercing - Tracer

B - High Explosive - Incendiary

C - High Explosive - Incendiary

### AMMUNITION

| | |
|---|---|
| Overall Length | 7.6 inches |
| Case | Rimless |

| TYPE | COLOR CODE | PROJECTILE WT. (Grams) |
|---|---|---|
| Ball | Black body, no fuze. | 130 |
| AP | | |
| Tracer | | |
| Incend. | | |
| HE | | |
| AP/T | Black body, white and green band | 155.4 |
| HE/I | Black body, red or yellow and red band | 125 |
| HE/AP | | |
| HE/T | Black body, green, yellow and red band | 134.2 |
| AP/I | | |

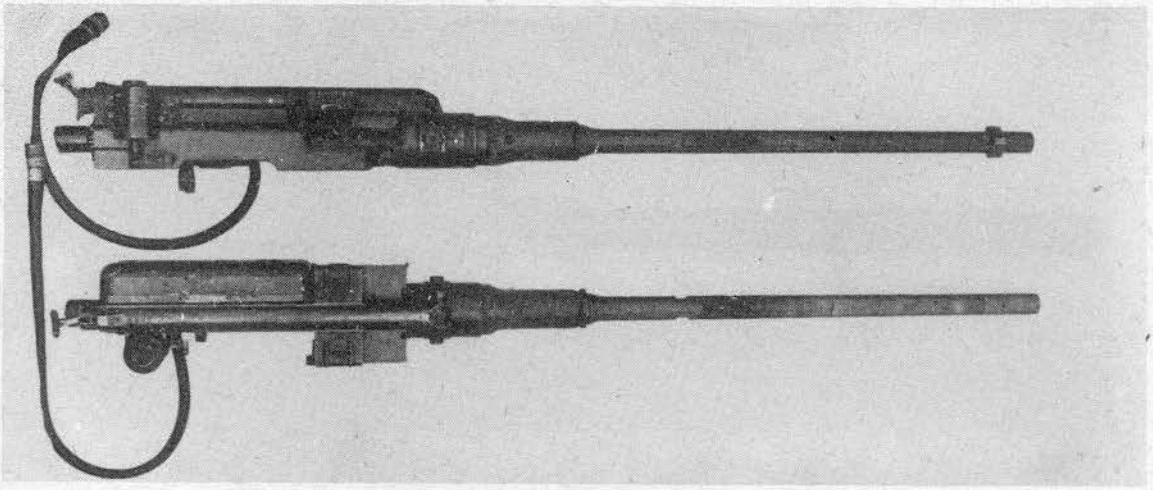
### EXPLOSIVE AND INCENDIARY COMPONENTS

| TYPE | CONTENTS |
|---|---|
| Incend. | Barium Nitrate, Aluminum, and Magnesium |
| HE | Black Powder or Cyclonite |
| HE/I | |



DATE December 1944

## 20 mm. MG 151/20 FIXED AIRCRAFT AUTOMATIC GUN (GERMAN) ARMY



### GENERAL

This weapon is of German manufacture and has been found only with German manufactured ammunition.

### PERFORMANCE

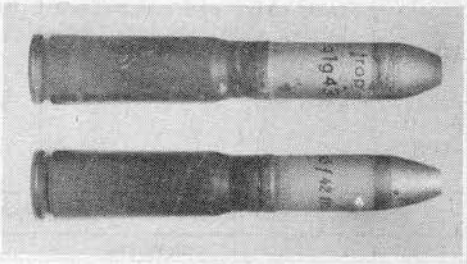
| | |
|---|---|
| Rate of Fire (est.) | 800 rounds per minute |
| Muzzle Velocity (est.) | 2500 feet per second |
| Effective Range (est.) | 800-1000 yards |

### CHARACTERISTICS

| | |
|---|---|
| Calibre | .79 inches (20 mm) |
| Overall Length | 69.5 inches |
| Weight of Gun | 92 pounds |
| Type of Feed | Disintegrating Metal Link Belt |
| Magazine Capacity | - |
| Wt. Magazine Empty | - |
| Wt. Magazine Full | - |
| Wt. 100 Linked rds. | 40 pounds |
| Charging System | Electrical or Hand |
| Firing System | Electrical |

A

B



A - High Explosive

B - High Explosive - Incendiary

### AMMUNITION

| | |
|---|---|
| Overall Length | 5.75 inches |
| Case | Rimless |

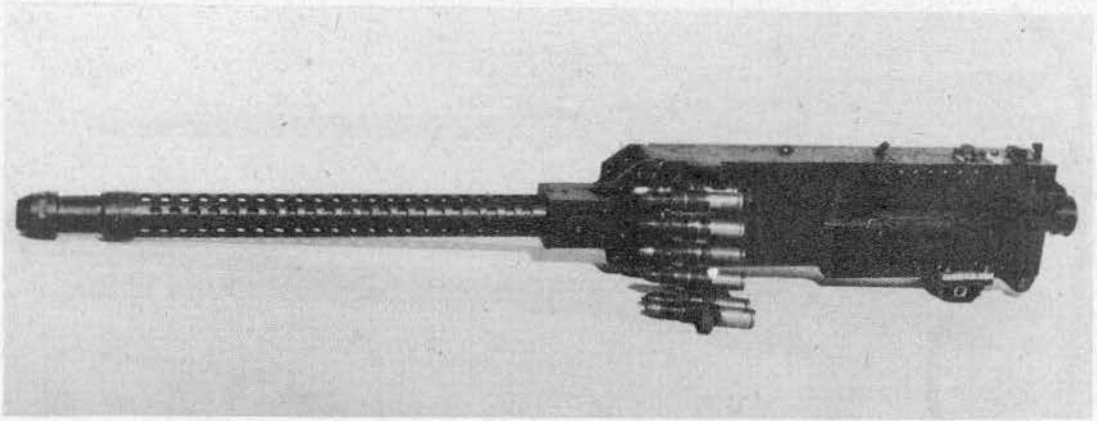
| TYPE | COLOR CODE | PROJECTILE WT. (Grams) |
|---|---|---|
| Ball | | |
| AP | Black body, no fuze | 115 |
| Tracer | | |
| Incend. | | |
| HE | Yellow body, blue and red band | 86.4 |
| AP/T | | |
| HE/I | Yellow body, green and red band | 113 |
| HE/AP | Black body, wide yellow band, no fuze | 116 |
| HE/T | | |
| AP/I | Black body, blue band, no fuze | 116 |

### EXPLOSIVE AND INCENDIARY COMPONENTS

| TYPE | CONTENTS |
|---|---|
| Incend. | Sodium Sulphide, Ferric Oxide, Aluminum, Magnesium, and Zinc |
| HE | PETN |
| HE/I | |

# ARMAMENT

## 20 mm. HO 5 FIXED AIRCRAFT AUTOMATIC GUN (BROWNING TYPE) - ARMY



### GENERAL

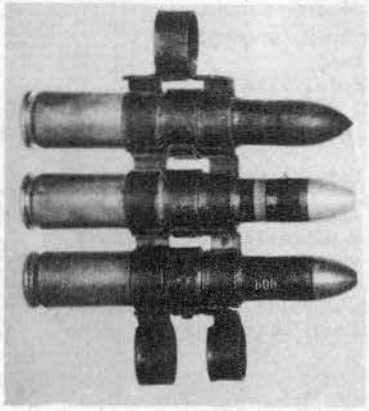
This gun is an enlarged model of the 12.7 mm Type 1 weapon. The operation is identical and the appearance is very similar. This is the first 20 mm gun capable of synchronized fire produced by the Japanese.

### PERFORMANCE

| | |
|---|---|
| Rate of Fire (est.) | 950 rounds per minute |
| Muzzle Velocity (est.) | 2350 feet per second |
| Effective Range (est.) | 1000 yards |

### CHARACTERISTICS

| | |
|---|---|
| Calibre | .79 inches (20 mm) |
| Overall Length | 58 inches |
| Weight of Gun | 72 rounds |
| Type of Feed | Disentegrating metal lirk belt |
| Magazine Capacity | - |
| Wt. Magazine Empty | - |
| Wt. Magazine Full | - |
| Wt. 100 Linked rds. | 49.4 rounds |
| Charging System | Hydraulic |
| Firing System | Electrical |



AP/T

HE/I, Fuzed

HE/I, Fuzeless

### AMMUNITION

| | |
|---|---|
| Overall Length | 5.75 inches |
| Case | Rimless |

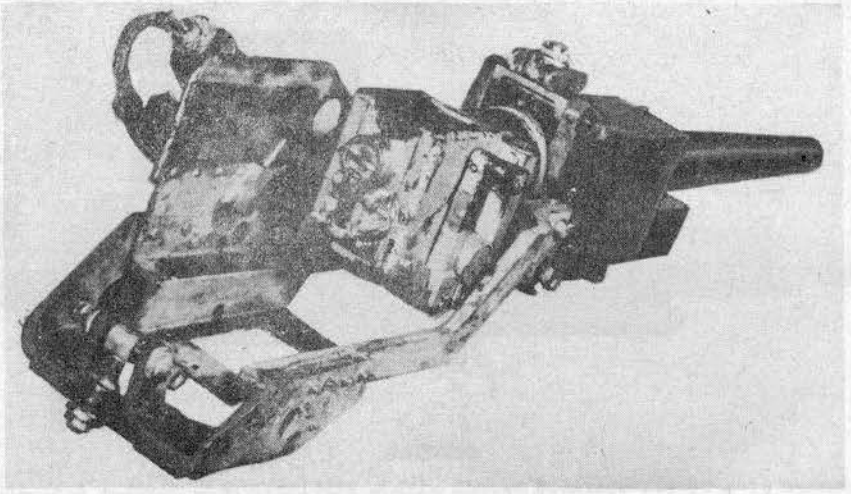
| TYPE | COLOR CODE | PROJECTILE WT. (Grams) |
|---|---|---|
| Ball | | |
| AP/T | Black body - plain | Unknown |
| | or | |
| Tracer | Black body, green band | " |
| | or | |
| Incend. | Black body, green and white bands | " |
| HE | | |
| AP | | |
| HE/I | Black body, red and yellow bands, aluminum fuze | Unknown |
| HE/AP | or | |
| HE/T | Black body - plain, brass nose cap | " |
| AP/I | | |

### EXPLOSIVE AND INCENDIARY COMPONENTS

| TYPE | CONTENTS |
|---|---|
| Incend. | Barium Nitrate, Aluminum, Magnesium |
| HE | PETN |
| HE/I | |

# ARMAMENT

## 37 mm. TYPE 98 FIXED TANK CANNON (SINGLE SHOT) - ARMY



### GENERAL

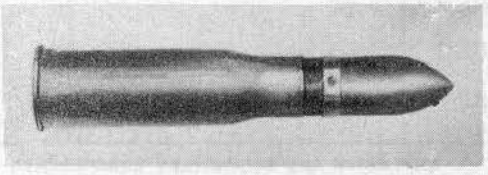
This replica of the French 37 mm field gun has been found mounted in the tunnel of the Army fighter NICK. Later examinations of NICK reveal that this weapon has been replaced by a 37 mm Type Ho 203 which is fully automatic. The new cannon is believed to have a slow rate of fire and low muzzle velocity, with a magazine capacity of 18 or 25 rounds.

### PERFORMANCE

| | |
|---|---|
| Rate of Fire (est.) | 15-20 rounds per minute |
| Muzzle Velocity (est.) | 2000 feet per second |
| Effective Range (est.) | 1000 yards |

### CHARACTERISTICS

| | |
|---|---|
| Calibre | 1.45 inches (37 mm) |
| Overall Length | 54 inches |
| Weight of Gun | 269 pounds |
| Type of Feed | Hand fed |
| Magazine Capacity | - |
| Wt. Magazine Empty | - |
| Wt. Magazine Full | - |
| Wt. 100 Linked rds | - |
| Charging System | - |
| Firing System | Electrical |



A 37 mm round with a nose fuze has also been used with this weapon. It is approximately 10.5 inches long.

### AMMUNITION

| | |
|---|---|
| Overall Length | 10 5/16 inches |
| Case | Rimmed Case |

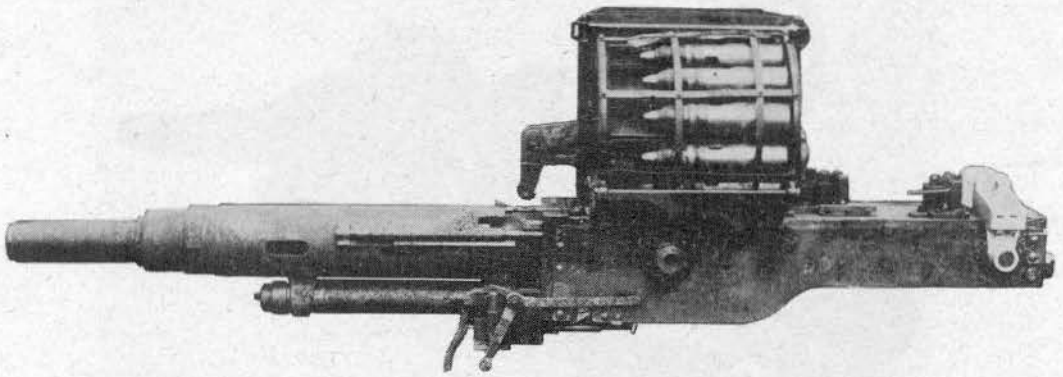
| TYPE | COLOR CODE | PROJECTILE WT. (Grams) |
|---|---|---|
| Ball | | |
| AP | | |
| Tracer | | |
| Incend. | | |
| HE | Black body, red, yellow and white or red and yellow bands | 640.7 |
| AP/T | | |
| HE/I | | |
| HE/AP | Black body, red nose, white band | 690.4 |
| HE/T | | |
| AP/I | | |

### EXPLOSIVE AND INCENDIARY COMPONENTS

| TYPE | CONTENTS |
|---|---|
| Incend. | |
| HE | TNT and Picric Acid |
| HE/I | |

# ARMAMENT

## 37 mm. HO 203 FIXED AIRCRAFT AUTOMATIC CANNON - ARMY



### GENERAL

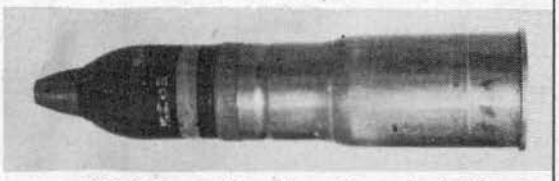
This cannon is a recoil operated weapon with a sliding breech block. A hydraulic cylinder under the barrel absorbs the recoil energy. The magazine is permanently attached to the receiver and contains an endless belt of clips which hold the ammunition. A complex feed mechanism moves the belt after each cycle and pushes a new cartridge into the breech. This cannon has been recovered only from the nose of NICK 1. Armor plate is mounted ahead and behind the magazine to protect the ammunition from gunfire.

### PERFORMANCE

| | |
|---|---|
| Rate of Fire (est.) | 300 rounds per minute |
| Muzzle Velocity (est.) | 2000 feet per second |
| Effective Range (est.) | 1000 yards |

### CHARACTERISTICS

| | |
|---|---|
| Calibre | 1.45 inches (37 mm.) |
| Overall Length | 60.3 inches |
| Weight of Gun | 200 pounds (est.) |
| Type of Feed | Magazine |
| Magazine Capacity | 25 rounds |
| Wt. Magazine Empty | - |
| Wt. Magazine Full | - |
| Wt. 100 Linked rds. | - |
| Charging System | Hydraulic |
| Firing System | Electrical |



High Explosive-Incendiary Cartridge

The explosive in this cartridge is more powerful than is normally used in cannon ammunition. Japanese respect for it is indicated by their use of armor ahead and behind the magazine.

### AMMUNITION

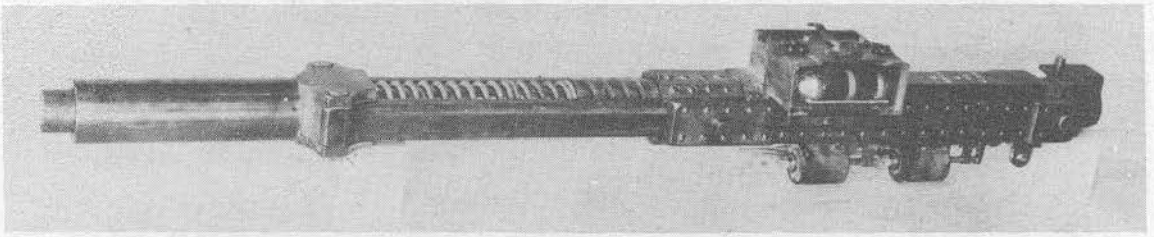
| | |
|---|---|
| Overall Length | 7.75 inches |
| Case | Rimmed |

| TYPE | COLOR CODE | PROJECTILE WT. (Grams) |
|---|---|---|
| Ball | | |
| AP | | |
| Tracer | | |
| Incend | | |
| HE | | |
| AP/T | | |
| HE/I | Black body, yellow and red bands, brass fuze | 436 |
| HE/AP | | |
| HE/T | | |
| AP/I | | |

### EXPLOSIVE AND INCENDIARY COMPONENTS

| TYPE | CONTENTS |
|---|---|
| Incend. | Not yet analysed. |
| HE | RDX |
| HE/I | |

## 40 mm. HO 301 FIXED AIRCRAFT AUTOMATIC CANNON - ARMY



### GENERAL

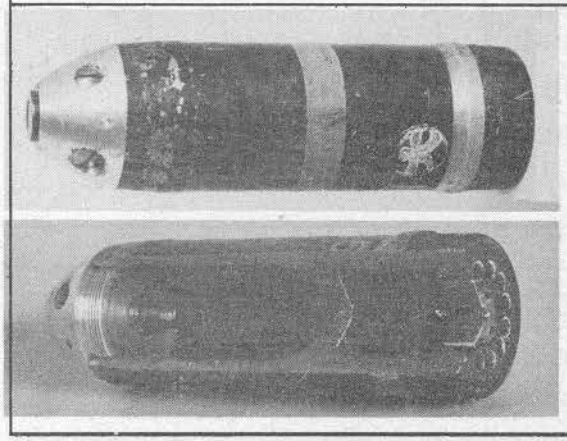
This cannon is a very light weapon for its caliber. The unusual type of ammunition permits simple construction and efficient operation. It operates on the blowback principle and is similar to the Oerlikon design thus far used only in Japanese Navy aircraft weapons. The wall thickness of the rifled barrel is uniform from muzzle to breech which is made possible by the low chamber pressure. This cannon has a very low muzzle velocity for an aircraft weapon and will be effective only at close ranges. It is charged manually, probably on the ground before takeoff. To date it has been installed only in the wings of TOJO.

### PERFORMANCE

| | |
|---|---|
| Rate of Fire (est.) | 400 rds per min. (document) |
| Muzzle Velocity (est.) | 760 ft. per sec. (tested) |
| Effective Range (est.) | 150 yards (est.) |

### CHARACTERISTICS

| | |
|---|---|
| Calibre | 1.57 inches (40 mm.) |
| Overall Length | 58.5 inches |
| Weight of Gun | 110 pounds |
| Type of Feed | Magazine |
| Magazine Capacity | 10 rounds (estimate) |
| Wt. Magazine Empty | Unknown |
| Wt. Magazine Full | Unknown |
| Wt. 100 Linked rds. | |
| Charging System | Manual |
| Firing System | Electrical |



### AMMUNITION

| | |
|---|---|
| Overall Length | 5.12 inches |
| Case | None |

| TYPE | COLOR CODE | PROJECTILE WT. (Grams) |
|---|---|---|
| HE | Black body, yellow and red bands, aluminum fuze | 568 |

The ammunition for this cannon is of a type not previously used in automatic weapons. The propelling charge is contained in a cavity in the rear of the projectile and no cartridge case is used. The charge appears to be the standard flake type smokeless powder used in small arms ammunition and is ignited by the usual type of primer. Twelve exhaust ports in the base plate permit the expanding gases to escape and drive the projectile forward. The copper rotating band acts as a gas seal.

This projectile is definitely not a rocket. The propellant is quick burning and burns completely before leaving the barrel.

### EXPLOSIVE AND INCENDIARY COMPONENTS

| TYPE | CONTENTS |
|---|---|
| Incend. | |
| HE | TNT |
| HE/I | |

# ARMAMENT

## 7.7 mm. TYPE 92 FLEXIBLE AIRCRAFT MACHINE GUN (LEWIS TYPE) - NAVY

### GENERAL

This is almost an exact copy of the British Lewis machine gun, and can fire the British .303 caliber ammunition.

### PERFORMANCE

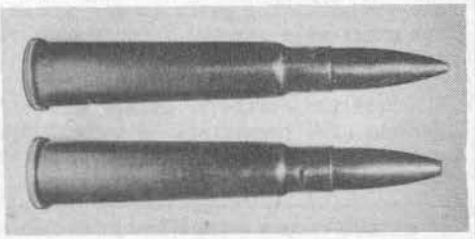
| | |
|---|---|
| Rate of Fire (est.) | 600 rounds per minute |
| Muzzle Velocity (est.) | 2500 feet per second |
| Effective Range (est.) | 600 yards |

### CHARACTERISTICS

| | |
|---|---|
| Calibre | .303 inches (7.7 mm) |
| Overall Length | 39 inches |
| Weight of Gun | 18.5 pounds |
| Type of Feed | Flat Drum Magazine |
| Magazine Capacity | (a) 47 rds. (b) 97 rds. |
| Wt. Magazine Empty | 3.75lbs. |
| Wt. Magazine Full | 8.8 lbs. |
| Wt. 100 Linked rds. | - |
| Charging System | Hand |
| Firing System | Hand-trigger |

A

B



A - Ball
B - Armor Piercing

The color marking is located on the base of the cartridge case.

### AMMUNITION

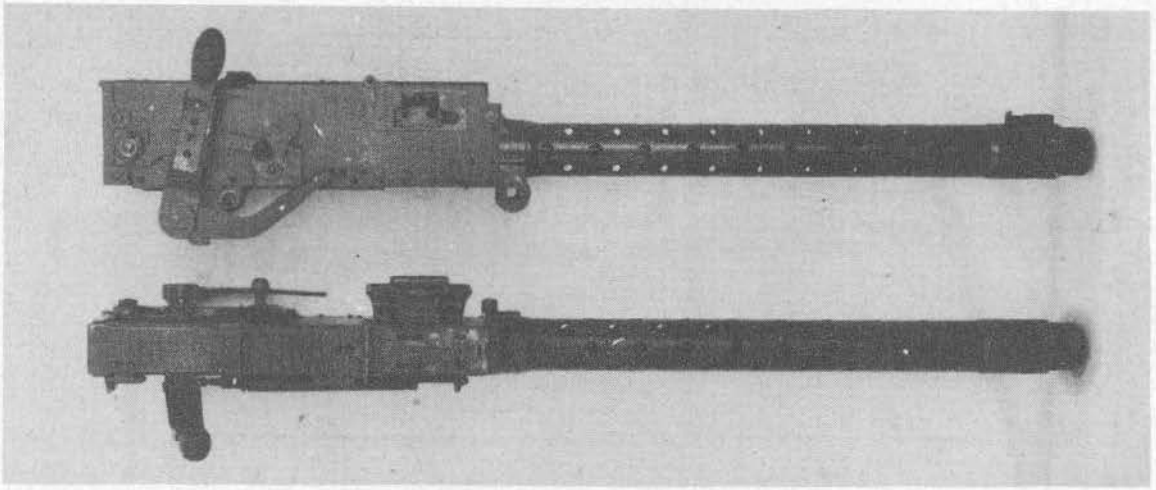
| | |
|---|---|
| Overall Length | 3.06 inches |
| Case | Rimmed |

| TYPE | COLOR CODE | PROJECTILE WT. (Grams) |
|---|---|---|
| Ball | Black Ring | 11.2 |
| AP | White Ring | 11.1 |
| Tracer | Scarlet Ring | 9.5 |
| Incend. | Green Ring | 9.6 |
| HE | | |
| AP/T | | |
| HE/I | Dull Red Ring | 9.8 |
| HE/AP | | |
| HE/T | | |
| AP/I | | |

### EXPLOSIVE AND INCENDIARY COMPONENTS

| TYPE | CONTENTS |
|---|---|
| Incend. | Phosphorous |
| HE | 50% PETN - 50% RDX |
| HE/I | Aluminum & TNT |

## 7.7 mm. TYPE 97 FIXED AIRCRAFT MACHINE GUN (VICKERS TYPE) - NAVY



### GENERAL

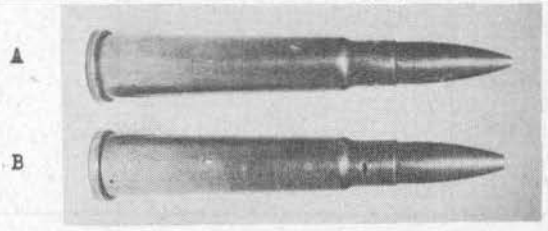
Except for minor changes, this gun is the same as the British Vickers .303 caliber. It is very similar to the Type 89 machine gun used by the Japanese Army Air Forces, but cannot fire the Army ammunition.

### PERFORMANCE

| | |
|---|---|
| Rate of Fire (est.) | 850 rounds per minute |
| Muzzle Velocity (est.) | 2450 feet per second |
| Effective Range (est.) | 600 yards |

### CHARACTERISTICS

| | |
|---|---|
| Calibre | .303 inches (7.7 mm) |
| Overall Length | 41 inches |
| Weight of Gun | 27 pounds |
| Type of Feed | Disintegrating Metal Link Belt |
| Magazine Capacity | - |
| Wt. Magazine Empty | - |
| Wt. Magazine Full | - |
| Wt. 100 Linked rds. | 8 pounds |
| Charging System | Hand-lever or Cable |
| Firing System | Mechanical |




A - Ball
B - Armor Piercing

The color marking is located on the base of the cartridge case.

### AMMUNITION

| | |
|---|---|
| Overall Length | 3.06 inches |
| Case | Rimmed |

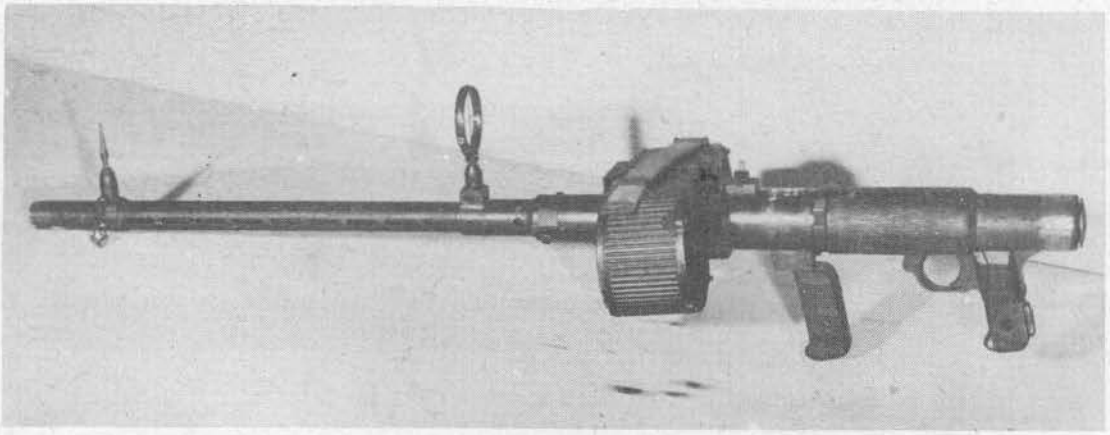
| TYPE | COLOR CODE | PROJECTILE WT. (Grams) |
|---|---|---|
| Ball | Black Ring | 11.2 |
| AP | White Ring | 11.1 |
| Tracer | Scarlet Ring | 9.5 |
| Incend. | Green Ring | 9.6 |
| HE | | |
| AP/T | | |
| HE/I | Dull Red Ring | 9.2 |
| HE/AP | | |
| HE/T | | |
| AP/I | | |

### EXPLOSIVE AND INCENDIARY COMPONENTS

| TYPE | CONTENTS |
|---|---|
| Incend. | Phosphorous |
| HE | 50% PETN & 50% RDX |
| HE/I | Aluminum and TNT |

# ARMAMENT

## 7.92 mm. TYPE 1 FLEXIBLE AIRCRAFT MACHINE GUN (GERMAN MG 15 TYPE) - NAVY



### GENERAL

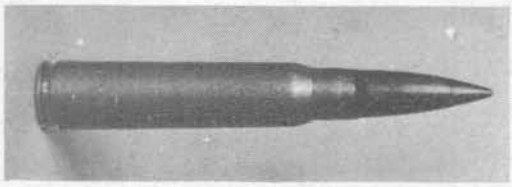
This weapon is almost identical with the Army 7.92 mm Type 98 gun with the exception of the second pistol grip and the wooden receiver extension. The exterior surfaces are rough but the internal parts are well finished.

### PERFORMANCE

| | |
|---|---|
| Rate of Fire (est.) | 1000 rounds per minute |
| Muzzle Velocity (est.) | 2500 feet per second |
| Effective Range (est.) | 600 yards |

### CHARACTERISTICS

| | |
|---|---|
| Calibre | .312 inches (7.92 mm) |
| Overall Length | 42.5 inches |
| Weight of Gun | 15.2 pounds |
| Type of Feed | Saddle type magazine |
| Magazine Capacity | 75 rounds |
| Wt. Magazine Empty | 5.5 pounds |
| Wt. Magazine Full | 10.0 pounds |
| Wt. 100 Linked rds. | - |
| Charging System | Hand |
| Firing System | Hand Trigger |



Standard Cartridge

Color marking appears around primer on base of cartridge.

Standard 7.92 mm Army ammunition has been recovered in this gun as well as two types of German manufactured cartridges.

### AMMUNITION

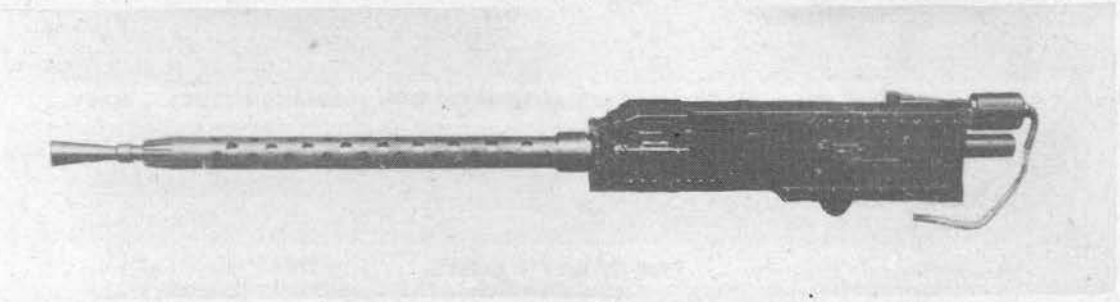
| | |
|---|---|
| Overall Length | 3.15 inches |
| Case | Rimless |

| TYPE | COLOR CODE | PROJECTILE WT. (Grams) |
|---|---|---|
| Ball | Black Ring | Unknown |
| AP | White Ring | " |
| Tracer | Red Ring | " |
| Incend. | Green Ring | " |
| HE | Purple Ring | " |
| AP/T | | |
| HE/I | | |
| HE/AP | | |
| HE/T | | |
| AP/I | | |

### EXPLOSIVE AND INCENDIARY COMPONENTS

| TYPE | CONTENTS |
|---|---|
| Incend. | Phosphorous |
| HE | PETN & RDX |
| HE/I | |

## 13.2 mm. TYPE 3 FIXED AND FLEXIBLE AIRCRAFT MACHINE GUN (BROWNING TYPE) - NAVY



### GENERAL

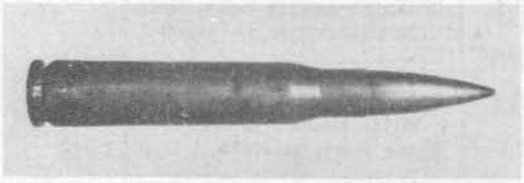
This gun resembles the U.S. Cal. .50 Browning very closely. The main differences are the use of a bolt latch for firing; substitution of springs for the fiber discs in the back plate buffer assembly, and the addition of a flash hider.

### PERFORMANCE

| | |
|---|---|
| Rate of Fire (est.) | 800 rounds per minute |
| Muzzle Velocity (est.) | 2620 feet per second |
| Effective Range (est.) | 900 yards |

### CHARACTERISTICS

| | |
|---|---|
| Calibre | .518 inches (13.2 mm) |
| Overall Length | 61 inches |
| Weight of Gun | 61.6 pounds |
| Type of Feed | Disentegrating metal link belt |
| Magazine Capacity | - |
| Wt. Magazine Empty | - |
| Wt. Magazine Full | - |
| Wt. 100 Linked rds. | 30.6 pounds |
| Charging System | Manual or Hydraulic |
| Firing System | Electrical |



Appearance of standard types of ammunition. Incendiary type has flat nose.

Color marking appears on base of shell around primer.

### AMMUNITION

| | |
|---|---|
| Overall Length | 5.38 inches |
| Case | Rimless |

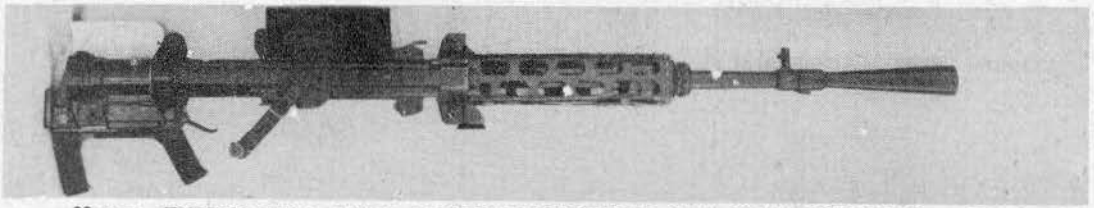
| TYPE | COLOR CODE | PROJECTILE WT. (Grams) |
|---|---|---|
| Ball | Black Ring | Unknown |
| AP | White Ring | " |
| Tracer | Red Ring | " |
| Incend. | Green Ring | " |
| HE | | |
| AP/T | | |
| HE/I | Purple Ring | " |
| HE/AP | | |
| HE/T | | |
| AP/I | | |

### EXPLOSIVE AND INCENDIARY COMPONENTS

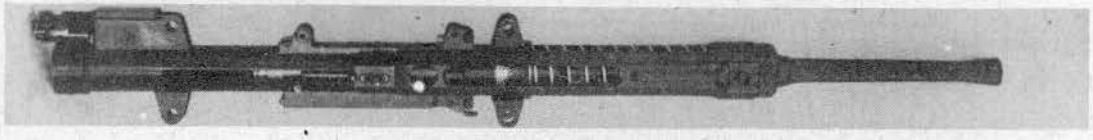
| TYPE | CONTENTS |
|---|---|
| Incend. | Phosphorous |
| HE | |
| HE/I | RDX and Aluminum Powder |

# ARMAMENT

## 20 mm. TYPE 99 MK 1 FLEXIBLE AIRCRAFT AUTOMATIC GUN (OERLIKON TYPE) - NAVY



## 20 mm. TYPE 99 MK 1 FIXED AIRCRAFT AUTOMATIC GUN (OERLIKON TYPE) - NAVY



Type 99 Mark 1 Model 4

### GENERAL

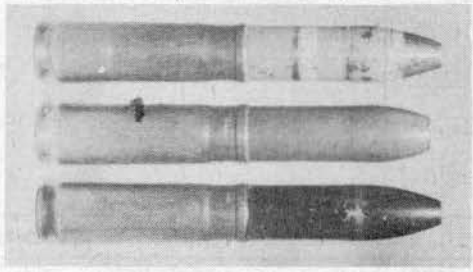
This is an extremely light weapon for its caliber. The different models of the Mark 1 version of this gun fire the same ammunition. The Mark 2 version (shown on the next page) is a larger weapon designed to use ammunition with the same projectile but with a greater amount of propellant.

### PERFORMANCE

| | |
|---|---|
| Rate of Fire (est.) | 500 rounds per minute |
| Muzzle Velocity (est.) | 2000 feet per second |
| Effective Range (est.) | 800 yards |

### CHARACTERISTICS

| | | |
|---|---|---|
| Calibre | .79 inches (20 mm) | |
| Overall Length | Fixed-53" Flexible-62" | |
| Weight of Gun | Fixed-47# Flexible-64.5# | |
| Type of Feed | French Drum Magazine | |
| Magazine Capacity | (a) 60 rds. | (b) 100 rds. |
| Wt. Magazine Empty | 19 lbs. | 23 lbs. |
| Wt. Magazine Full | 45 lbs. | 67 lbs. |
| Wt. 100 Linked rds. | - | |
| Charging System | Pneumatic or manual | |
| Firing System | Pneumatic or manual | |




A - High Explosive-incendiary

B - Tracer

C - Ball

### AMMUNITION

Overall Length 5.22 to 5.68 inches
Case Oerlikon Type

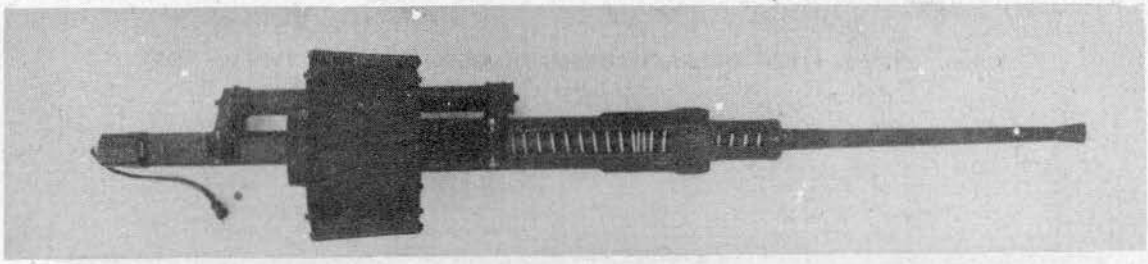
| TYPE | COLOR CODE | PROJECTILE WT. (Grams) |
|---|---|---|
| Ball | Black body, flat tip, no fuze | 126 |
| AP | Black body, pointed tip, no fuze | 131.7 |
| Tracer | Red or green body, no fuze | |
| Incend. | | |
| HE | Dark brown, black or orange-yellow body - with or without white bands | 129 |
| AP/T | | |
| HE/I | Greenish yellow body, with or without white bands | |
| HE/AP | | |
| HE/T | Red body, with or without white bands | |
| AP/I | White body, no fuze | |

### EXPLOSIVE AND INCENDIARY COMPONENTS

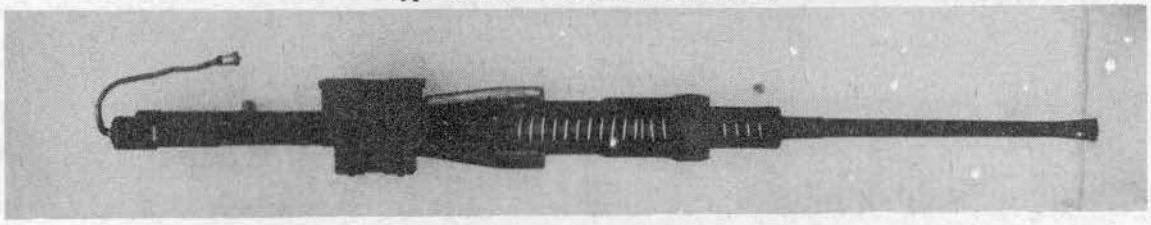
| TYPE | CONTENTS |
|---|---|
| Incend. | White Phosphorus |
| HE | TNT |
| HE/I | Aluminum, Potassium nitrate, Nitro-cellulose |

# ARMAMENT

## 20 mm. TYPE 99 MK 2 FIXED AIRCRAFT AUTOMATIC GUN (OERLIKON TYPE) - NAVY



Type 99 Mark 2 Model 4 (Belt Fed)



### GENERAL

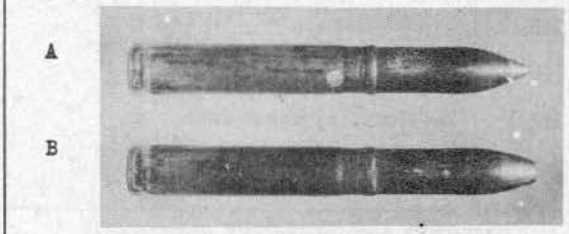
In order to increase the muzzle velocity, this weapon was developed from the Type 99 Mark 1. The ammunition used contains the same projectile but a greater amount of propellant charge. The overall length has been increased approximately nineteen inches.

### PERFORMANCE

| | |
|---|---|
| Rate of Fire (est.) | 500 rounds per minute |
| Muzzle Velocity (est.) | 2500-2700 feet per second |
| Effective Range (est.) | 1000 yards |

### CHARACTERISTICS

| | |
|---|---|
| Calibre | .79 inches (20 mm) |
| Overall Length | 72 inches |
| Weight of Gun | 75 pounds |
| Type of Feed | Mod 3 - French Drum Magazine<br>Mod 4 - Belt fed |
| Magazine Capacity | 100 rounds |
| Wt. Magazine Empty | 40 lbs. |
| Wt. Magazine Full | 90 lbs. |
| Wt. 100 Linked rds. | |
| Charging System | Pneumatic or manual |
| Firing System | Pneumatic, manual, or electrical |




A - Armor Piercing
B - High Explosive

The same projectile is used in both Mark I and Mark 2 cartridges.

### AMMUNITION

| | |
|---|---|
| Overall Length | 6.75 inches |
| Case | Oerlikon Type |

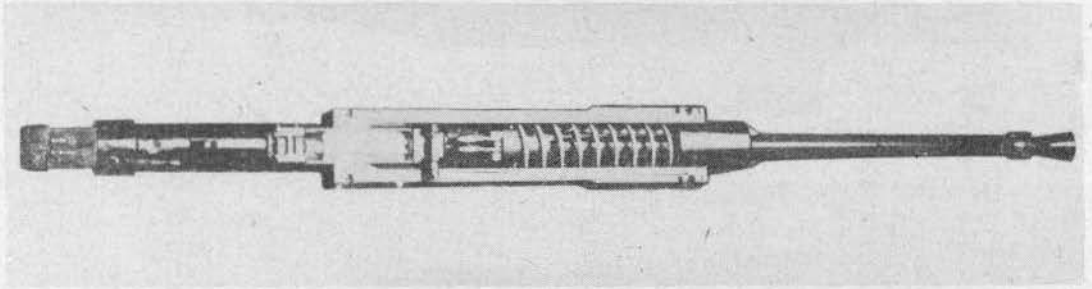
| TYPE | COLOR CODE | PROJECTILE WT. (Grams) |
|---|---|---|
| Ball | Black body, flat tip, no fuze | 126 |
| AP | Black body, pointed tip, no fuze | 131.7 |
| Tracer | Red or green body, no fuze | |
| Incend. | | |
| HE | Dark brown, black or orange-yellow body - with or without white bands | 129 |
| AP/T | | |
| HE/I | Greenish yellow body, with or without white bands | |
| HE/AP | | |
| HE/T | Red body, with or without white bands | |
| AP/I | White body, no fuze | |

### EXPLOSIVE AND INCENDIARY COMPONENTS

| TYPE | CONTENTS |
|---|---|
| Incend. | |
| HE | |
| HE/I | |

# ARMAMENT

## 30 mm. TYPE 2 FIXED AIRCRAFT AUTOMATIC GUN (OERLIKON TYPE) - NAVY



### GENERAL

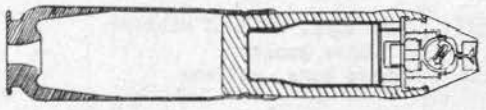
This gun has not yet been recovered but documents indicate that it is in production. Ammunition for it has been recovered in the field. In general its construction is very similar to the 20 mm Type 99 Gun.

### PERFORMANCE

| | |
|---|---|
| Rate of Fire (est.) | 400 rounds per minute |
| Muzzle Velocity (est.) | 2300 feet per second |
| Effective Range (est.) | 1000 yards |

### CHARACTERISTICS

| | |
|---|---|
| Calibre | 1.179 inches (30 mm) |
| Overall Length | 82.5 inches |
| Weight of Gun | 112 pounds |
| Type of Feed | Magazine |
| Magazine Capacity | 42 rounds |
| Wt. Magazine Empty | Unknown |
| Wt. Magazine Full | 84.3 pounds |
| Wt. 100 Linked rds. | - |
| Charging System | Manual |
| Firing System | Electrical |



Incendiary Cartridge

Other types of ammunition have same outline as shown above. White bands may appear around projectile indicating modification.

### AMMUNITION

| | |
|---|---|
| Overall Length | 6.56 inches |
| Case | Oerlikon Type |

| TYPE | COLOR CODE | PROJECTILE WT. (Grams) |
|---|---|---|
| Ball | Black body, no fuze | Unknown |
| AP | | |
| Tracer | Black body, red tip, no fuze | " |
| Incend. | Greenish yellow body, aluminum fuze | " |
| HE | Rust brown body, aluminum fuze | " |
| AP/T | | |
| HE/I | | |
| HE/AP | | |
| HE/T | Red body, aluminum fuze | " |
| AP/I | White body, no fuze | " |

### EXPLOSIVE AND INCENDIARY COMPONENTS

| TYPE | CONTENTS |
|---|---|
| Incend. | Phosphorous |
| HE | 50/50 PETN and TNT |
| HE/I | |

The majority of Japanese airborne sets have been well constructed and of orthodox design although they have lagged behind the Allies in technique. Naval equipment accepted since 1943 is comparable with equivalent Allied sets and appears to be of original design. Variations in circuit, tube combinations and layout may occur with or without any indication in the set nomenclature, and model numbers have not been included where only minor variations are known to have occurred.

## NAVY

| EQUIPMENT | AIRCRAFT |
|---|---|
| Type 96 Ku 1 | ZEKE |
| Type 96 Ku 2 | GLEN-SLIM-SEIRAN (M6A1)-DINAH-JUDY-VAL-"Fighter-Bomber" |
| Type 96 Ku 3 | NORA-PAUL-PETE-TOKAI (Q1W1)-BETTY-JAKE-VAL |
| Type 96 Ku 4 | BETTY- NELL |
| Type 98 Ku 3 | BETTY |
| Type 98 Ku 4 | BETTY-NELL-EMILY-MAVIS |
| Type 1 Ku 3 | KATE-JILL-FRANCES-PAUL-GLEN-JAKE-SLIM-SEIRAN (M6A1)-ZEKE-VAL-JUDY |
| Type 1 Ku 3 Model 1 | IRVING-JAKE |
| Type 2 Ku 3 | PAUL-JAKE-KATE-JILL-FRANCES-BETTY-NELL-EMILY-MAVIS |
| Type 3 Ku 1 | JUDY-RUFE-REX-ZEKE-JACK-GEORGE-BETTY-LIZ |
| Type 3 Ku 5 | EMILY-MAVIS-BETTY-NELL |
| Type 0 Ku 4 (RDF) | ZEKE-KATE-VAL-JAKE-BABS-JUDY-FRANCES-JILL-PAUL-GLEN-SLIM-SEIRAN (M6A1)-JACK-GEORGE |
| Type 1 Ku 3 (RDF) | |

## ARMY

| | |
|---|---|
| Type 94 Hi 2 | SALLY |
| Type 96 Hi 2 | DINAH-LILY-HELEN |
| Type 99 Hi 1 | DINAH-SALLY-HELEN |
| Type 99 Hi 2 | DINAH-LILY |
| Type 99 Hi 3 | TONY-TOJO-OSCAR-SONIA-DINAH-FRANK |
| Type 99 Hi 4 | SALLY-LILY-HELEN |
| Hi Model 2 (RDF) | SALLY-LILY-HELEN |
| Hi 2 (RDF) | DINAH |
| Type 4 Hi 3 Model 1 | FRANK |

951

# RADIO

## RADIO EQUIPMENT—JAPANESE AIRCRAFT

| | JAPANESE SET DESIGNATION | | | |
|---|---|---|---|---|
| | Type 94 Hi 2 | Type 96 Hi 2 | Type 96 Hi 3 Mod 2 | Type 99 Hi 1 and Hi 1 |
| **TECHNICAL DATA** | | | | |
| Frequency Range (Megacycles) | 1.4-7.9 | 0.2-0.5<br>1.5-7.5 | Rcvr 2?<br>Trans. 5? | 2.5-18.0 |
| Transmitter Circuit | Crystal or Self Excited | Crystal | Crystal | Crystal or Self Excited |
| Power Output | 15-20 Watts | 8-10 Watts | 3 Watts ? | 30 Watts |
| Transmitter Tuning | 3 Controls | 4 Controls | 1 Control ? | 3 Controls |
| Type of Emission | CW, MCW, and Phone | CW, MCW, and Phone | Phone | CW, MCW, and Phone |
| Antenna | Fixed Aircraft | Fixed Aircraft | Fixed Aircraft? | Fixed Aircraft |
| Receiver Circuit | Superheterodyne | Superheterodyne | TRF Reflex | Superheterodyne |
| Sensitivity | | | | |
| Selectivity | | | | |
| Receiver Tuning | 1 Control | 2 Controls | | 1 Control<br>3 Switches |
| Tubes Used | (3) UX865 (1) UZ77<br>(1) UT6A7 (1) UZ78<br>(1) UZ37 (1) UZ41 | (3) UZ510 (1) UY76<br>(1) UY133A(1) UX109<br>(1) UZ135 | (1) UY76 (1) 6B7<br>(1) UZ41 (2) UZ6D6<br>(2) UY76 (1) UT6L7<br>(1) UT6B7 | (3) UX807A<br>(6) UT6F7 |
| Trans. and Rec. Size (Inches) | | 17 x 13 x 11 | | |
| Overall Weight (Lbs.) | 36 | 82<br>(complete) | | 74<br>(complete) |
| Power Source | 2 Dynamotors | 1 Dynamotor | Vibrator | 2 Dynamotors |
| **TACTICAL DATA** | | | | |
| Use in Aircraft | Command | Command | Liaison | Command |
| Range (Mi. & Alt. in ft.) | | | | |
| **REMARKS** | Obsolete | Obsolescent | Obsolete | |

## RADIO EQUIPMENT—JAPANESE AIRCRAFT

| | JAPANESE SET DESIGNATION | | | |
|---|---|---|---|---|
| | Type 99 Hi 2 and Hi 2 | Type 99 Hi 3 and Hi 3 | Type 99 Hi 4 and Hi 4 | Type 4 Hi 3 Mod 1 |
| **TECHNICAL DATA** | | | | |
| Frequency Range (Megacycles) | 1.5-15 | Rcvr 1.5-6.7<br>Trans. 2.5-5.0 | 44.0-50.0 | 4.0-6.0 |
| Transmitter Circuit | Crystal Oscillator | Crystal Oscillator | Crystal Oscillator | Crystal Oscillator |
| Power Output | 18 Watts | 8 Watts Phone<br>15 Watts C.W. | 12 Watts | 8 Watts |
| Transmitter Tuning | 5 Controls<br>1 Switch | 2 Controls | 3 Controls | 2 Controls |
| Type of Emission | CW, MCW, and Phone | CW, MCW, and Phone | Phone | CW |
| Antenna | Fixed Aircraft | Fixed Aircraft | Fixed Aircraft | Fixed Aircraft |
| Receiver Circuit | Superheterodyne | Superheterodyne | Superheterodyne | Superheterodyne |
| Sensitivity | | | 4.6 Microvolts | |
| Selectivity | | | 20 KC at -60B | |
| Receiver Tuning | 2 Controls | 3 Controls | 4 Controls | 1 Control |
| Tubes Used | (2) UX807A<br>(5) UT6F7 | (2) UX807A<br>(4) UT6F7 | (3) UX807A<br>(4) UT6F7 | (3) UX807A<br>(5) UT6F7 |
| Trans. and Rec. Size (Inches) | | Rcvr 8 x 7 x 5⅛<br>Trans 6 x 7 x 8 | 15 x 7½ x 8⅛ | |
| Overall Weight (Lbs.) | 42<br>(complete) | 55<br>(complete) | 46<br>(complete) | |
| Power Source | 1 Dynamotor | 1 Dynamotor | 1 Dynamotor | |
| **TACTICAL DATA** | | | | |
| Use in Aircraft | Command | Command<br>Liaison | Liaison | Command<br>Liaison |
| Range (Mi. & Alt. in ft.) | | 70 @ 10,000 | 80 @ 10,000 | |
| **REMARKS** | | Separate Units for Fighter Use.<br>Model 2 Receiver 4.0-6.0 mc/s<br>(5) 6F7 | | |

# RADIO

RADIO

## RADIO EQUIPMENT—JAPANESE AIRCRAFT

| | JAPANESE SET DESIGNATION | | | |
|---|---|---|---|---|
| | Hi 1 Mod. 2 Radio Homing and Direction Finder | Hi 2 Radio Homing and Direction Finder | | |
| **TECHNICAL DATA** | | | | |
| Frequency Range (Megacycles) | 0.160-0.385 | 0.16-1.20 (approx.) | | |
| Transmitter Circuit | | | | |
| Power Output | | | | |
| Transmitter Tuning | | | | |
| Type of Emission | | | | |
| Antenna | Single Loop | | | |
| Receiver Circuit | | | | |
| Sensitivity | | | | |
| Selectivity | | | | |
| Receiver Tuning | 3 Remote Controls | | | |
| Tubes Used | (5) UY76 (4) UZ6D8 (1) UZ6L7G | | | |
| Trans. and Rec. Size (Inches) | 17½ x 7 x 9½ | | | |
| Overall Weight (Lbs.) | 24 | | | |
| Power Source | 2 Dynamotors | | | |
| **TACTICAL DATA** | | | | |
| Use in Aircraft | Direction Finding | | | |
| Range (Mi. & Alt. in ft.) | | | | |
| **REMARKS** | Similar to German Telefunken Type EZ-2 | Believed to be smaller version of Hi 1 Mod. 2 | | |

# RADIO

## RADIO EQUIPMENT—JAPANESE AIRCRAFT

| | JAPANESE SET DESIGNATION | | | |
|---|---|---|---|---|
| | | | | |
| **TECHNICAL DATA** | | | | |
| Frequency Range (Megacycles) | | | | |
| Transmitter Circuit | | | | |
| Power Output | | | | |
| Transmitter Tuning | | | | |
| Type of Emission | | | | |
| Antenna | | | | |
| Receiver Circuit | | | | |
| Sensitivity | | | | |
| Selectivity | | | | |
| Receiver Tuning | | | | |
| Tubes Used | | | | |
| Trans. and Rec. Size (Inches) | | | | |
| Overall Weight (Lbs.) | | | | |
| Power Source | | | | |
| **TACTICAL DATA** | | | | |
| Use in Aircraft | | | | |
| Range (Mi. & Alt. in ft.) | | | | |
| **REMARKS** | | | | |

## RADIO EQUIPMENT—JAPANESE AIRCRAFT

| | JAPANESE SET DESIGNATION | | | |
|---|---|---|---|---|
| | Type 99 Flying Mark 1 | Type 99 Flying Mark 2 | Type 99 Flying Mark 3 | Type 99 Flying Mark 4 |
| **TECHNICAL DATA** | | | | |
| Frequency Range (Megacycles) | 2.5-18.0 | 1.5-15.0 | 1.5-6.7 (Rec.)<br>2.5-5.0 (Trans.) | 44.0-50.0 |
| Transmitter Circuit | Crystal or Self Excited | Crystal Oscillator | Crystal Oscillator | Crystal Oscillator |
| Power Output | 30 Watts (approx) | 18 Watts (approx) | 4 Watts Phone<br>5 Watts CW | 12 Watts |
| Transmitter Tuning | 3 Controls | | 2 Controls | 3 Controls |
| Type of Emission | CW, MCW, and Phone | CW, MCW, and Phone | CW, MCW, and Phone | Phone |
| Antenna | Fixed Aircraft Type | Fixed Aircraft Type | Fixed Aircraft Type | Fixed Aircraft Type |
| Receiver Circuit | Superheterodyne | Superheterodyne | Superheterodyne | Superheterodyne |
| Sensitivity | | | 4.6 Microvolts | |
| Selectivity | | | 20 kc at 6 db down | |
| Receiver Tuning | 1 Knob, 3 Switches | | 3 Controls | 4 Controls |
| Tubes Used | (3) UX807A<br>(6) UT6F7 | (2) UX807A<br>(5) UT6F7 | (2) UX807A<br>(4) UT6F7 | (3) UX807A<br>(4) UT6F7 |
| Trans. and Rec. Size (Inches) | Trans. & Rec. are the same size. | | Rec. 8 x 7 x 5-3/8<br>Trans.5-3/4x7x7-3/4 | 15 x 7-3/4 x 8-5/8 |
| Overall Weight (Lbs.) | Rec.-11, Trans.-14<br>Complete-74 | Rec.-9, Trans.-13<br>Complete-42 | Complete-55 | 25 - Trans. & Rec.<br>19½-Power Unit |
| Power Source | 2 Dynamotors | 1 Dynamotor | 1 Dynamotor | 1 Dynamotor |
| **TACTICAL DATA** | | | | |
| Use in Aircraft | Air-Ground Liaison | Air-Ground Liaison | Command Set | Air-Ground Liaison |
| Range (Mi. & Alt. in ft.) | | | 70 @ 10,000 | 80 @ 10,000 |
| **REMARKS** | Seperate dynamotors are used for the Rec. and Trans., connected to units by a junction box. | One dynamotor with input regulator used. No remote control arrangement | A Control box, antenna loading coil and voltage regulator make up a complete set. | From data known, this gear appears to be of good construction and electrical design. |

# RADIO

## RADIO EQUIPMENT—JAPANESE AIRCRAFT

| | JAPANESE SET DESIGNATION | | | |
|---|---|---|---|---|
| | Hi 1 Type 99 Radio Set. (Modified Type 99 Flying Mark 1) | Hi 2 Type 99 Radio Set. (Modified Type 99 Flying Mark 2) | Hi 3 Type 99 Radio Set. (Modified Type 99 Flying Mark 3) | Hi 4 Type 99 Radio Set. (Modified Type 99 Flying Mark 4) |
| **TECHNICAL DATA** | | | | |
| Frequency Range (Megacycles) | 5.0–7.5 (approx.) | 1.5–15.0 | 2.5–7.3 (Trans.) 1.5–6.7 (Rece.) | 44.0–50.0 |
| Transmitter Circuit | | Crystal Oscillator | Crystal Oscillator | |
| Power Output | 15–20 Watts | 5 Watts Phone | 4 Watts Phone 5 Watts CW | 20 Watts (approx.) |
| Transmitter Tuning | | 1 Control 2 Switches | 2 Controls | |
| Type of Emission | | CW, MCW, and Phone | CW, MCW, and Phone | |
| Antenna | | Fixed Aircraft Type | Fixed Aircraft Type | Fixed Aircraft Type |
| Receiver Circuit | | Superheterodyne (Uses plug in Coils) | Superheterodyne | |
| Sensitivity | | | | |
| Selectivity | | | | |
| Receiver Tuning | | 1 Control | 3 Controls | |
| Tubes Used | Trans.-(3) UX807A Rec. - ? | Trans.-(2) UX807A Rec. -(5) UT6F7 | Trans.-(2) UX807A Rec. -(4) UT6F7 (Also 5 tube Model) | Trans.-(3) UX807A Rec. -(4) UT6F7 |
| Trans. and Rec. Size (Inches) | | 13-3/8x8-5/8x7-3/4 (Both in one Case) | Each Unit $5\frac{1}{2}$ x $7\frac{1}{2}$ x $8\frac{1}{4}$ | |
| Overall Weight (Lbs.) | | 24 | Each Unit - $10\frac{1}{2}$ | |
| Power Source | | 1 Dynamotor | 1 Dynamotor | |
| **TACTICAL DATA** | | | | |
| Use in Aircraft | | Air-Ground Liaison and Command. | Air-Ground Liaison | |
| Range (Mi. & Alt. in ft.) | | | | |
| **REMARKS** | | Neatly & Compactly built. Moisture proofing has been attempted by spraying components with a clear substance. | This set is very compact and well constructed. | |

## RADIO EQUIPMENT—JAPANESE AIRCRAFT

| | JAPANESE SET DESIGNATION | | | |
|---|---|---|---|---|
| | Type 1 Aero Mark 3 | Type 2 Aero Mark 3 | Type 3 Aero Mark 1 | |
| **TECHNICAL DATA** | | | | |
| Frequency Range (Megacycles) | 30.0-45.0 | 0.3-0.5, 2.5-5.0 5.0-10.0, 10.0-20.0 | 5.0-10.0 | |
| Transmitter Circuit | Crystal Oscillator | Crystal or Self Excited | Crystal or Self Excited | |
| Power Output | 5 Watts | 200 Watts CW 60 Watts Phone | 75 Watts CW 25 Watts Phone | |
| Transmitter Tuning | 2 Controls | 4 Controls | 2 Controls | |
| Type of Emission | MCW and Phone | CW, MCW, and Phone | CW, MCW, and Phone | |
| Antenna | Fixed Aircraft Type | Fixed Aircraft Type | Fixed Aircraft Type | |
| Receiver Circuit | Superheterodyne | Superheterodyne | Superheterodyne | |
| Sensitivity | | | 0.8-3.8 Microvolts | |
| Selectivity | | | 20.8 Kc at 6 db down for CW. | |
| Receiver Tuning | 1 Control | 5 Controls | 1 Control | |
| Tubes Used | (4) 6V6, (2) 6K7 (2) 6J7, Other Models use other Types. | | Trans.-(1) FB325A (1) FZ064A Rec.- FM2A05A (10) | |
| Trans. and Rec. Size (Inches) | 14-1/8 x 6 x 6 (Both in one case) | | 17½ x 8½ x 7-3/4 | |
| Overall Weight (Lbs.) | 25 | RF Unit - 100 | 70 | |
| Power Source | Vibrator | | 2 Dynamotors | |
| **TACTICAL DATA** | | | | |
| Use in Aircraft | Command Set | Command and Liaison Set | Air-Ground Liaison and Command Set. | |
| Range (Mi. & Alt. in ft.) | 50 @ 10,000 | | 100 @ 10,000 | |
| **REMARKS** | Well constructed very compact, but no evidence of weather or fungus protection. | Variometer tuning in the high freq. trans. circuit. Identical tubes used in the Rec. | Excellent mechanical and electrical design. No weather proofing or fungus protection. | |

# RADIO

## RADIO EQUIPMENT—JAPANESE AIRCRAFT

| | JAPANESE SET DESIGNATION | | | |
|---|---|---|---|---|
| | Flying Mark 1 Radio Homing and Direction Finder | Flying Mark 2 Radio Homing and Direction Finder | Type 0 Aero Mark 4 Radio Homing and Direction Finder | Type 1 Aero Mark 3 Radio Homing and Direction Finder |
| **TECHNICAL DATA** | | | | |
| Frequency Range (Megacycles) | 0.160-0.385 | 0.16-1.20 (approx.) | 0.165-1.200 | 0.17-0.46<br>0.45-1.20 |
| Transmitter Circuit | None | None | None | None |
| Power Output | | | | |
| Transmitter Tuning | | | | |
| Type of Emission | | | | |
| Antenna | Single Loop | | Single Loop - 42 Cm Diameter | Single Rotatable Loop |
| Receiver Circuit | | | Heterodyne | Superheterodyne |
| Sensitivity | | | | |
| Selectivity | | | | |
| Receiver Tuning | 3 Remote Controls | | | 2 Remote Controls |
| Tubes Used | (5) UY76, (4) UZ6D6<br>(1) UZ6L7G | | 6 Tubes | (1) 6P7G, (3) 6V6<br>(2) 6J7, (4) 6K7<br>(1) 6B8, (1) 6L7<br>(1) 6J5, (1) 6Q7 |
| Trans. and Rec. Size (Inches) | 17-3/4 x 7 x 9-3/4 | | Different Models use different sizes | 18 x 9½ x 6½ |
| Overall Weight (Lbs.) | 24 | | | 15 |
| Power Source | 2 Dynamotors | | | 1 Dynamotor |
| **TACTICAL DATA** | | | | |
| Use in Aircraft | Direction Finding and Homing | Direction Finding and Homing | Direction Finding and Homing | Direction Finding and Homing |
| Range (Mi. & Alt. in ft.) | | | | |
| **REMARKS** | Similar to German Telefunken Equipment EZ-2. Two sizes may be found. | Not much data is available on this equipment. | May or may not be equipped with a compass. Course indicator is a zero center DC type Ammeter. | Identical with U.S. Fairchild set. May be used to rendezvous fighters with enemy planes. |

# RADIO

RADIO

## RADIO EQUIPMENT—JAPANESE AIRCRAFT

| | JAPANESE SET DESIGNATION | | | |
|---|---|---|---|---|
| | Type 96 Ku 1 | Type 96 Ku 2 | Type 96 Ku 3 | Type 96 Ku 4 |
| **TECHNICAL DATA** | | | | |
| Frequency Range (Megacycles) | 3.8-5.8 | .3-.5<br>1.7-3.5<br>5.0-10.0 | 0.2-0.5<br>4.5-11.2 | 0.3-15.0 |
| Transmitter Circuit | Crystal Oscillator | Crystal Oscillator | Crystal Oscillator | Crystal Oscillator |
| Power Output | 8-10 Watts | 27 Watts CW<br>9 Watts Phone | 75 Watts (High)<br>8 Watts (Low) | 175 Watts CW (approx.) |
| Transmitter Tuning | 1 Control | 2 Controls | 3 Controls | |
| Type of Emission | CW and Phone | CW, MCW and Phone | CW | CW and Phone |
| Antenna | Fixed Aircraft | Fixed Aircraft | Fixed Aircraft | Fixed Aircraft |
| Receiver Circuit | Superheterodyne | Superheterodyne | Superheterodyne | Superheterodyne HF TRF LF |
| Sensitivity | | 13 Microvolts | 3.5-1300 Microvolts | |
| Selectivity | | 19 KC @ -6DB | 2-10 KC @ -6DB | |
| Receiver Tuning | 2 Controls | 4 Controls | 2 Controls | |
| Tubes Used | (2) UX47Z (2)UX134<br>(1)UY133A(1)UZ135<br>(1)UX109 | (3)UZ510 (2)UZ66<br>(1)UT6L7G(3)UY76<br>(1)UT76 (1)UT6B7<br>(1)UZ41 | (1)UZ816 (1)UX865<br>(1)UX47A (2)UY36A<br>(5)UY37A (1)UY39A | (1)UX47C (1)UV816D<br>(2)UY36A (4)UY37A<br>(1)UY39A |
| Trans. and Rec. Size (Inches) | Each Unit<br>9½ x 8 x 5½ | 17 x 13 x 10⅛ | Trans.18½ x 14 x 10<br>Rcvr.14 x 10 x 7½ | |
| Overall Weight (Lbs.) | 38<br>(complete) | 48<br>(complete) | 40 | 98<br>(complete) |
| Power Source | 1 Dynamotor | 1 Dynamotor | 1 Dynamotor & Vibrapack | 1 Dynamotor & Vibrapack |
| **TACTICAL DATA** | | | | |
| Use in Aircraft | Command | Command | Command<br>Liaison | Command |
| Range (Mi. & Alt. in ft.) | 50 @ 10,000 | 200 @ 10,000 | 50 @ 10,000 (Low)<br>200 @ 10,000(High) | 200 @ 10,000 |
| **REMARKS** | | Model 1 has 8 crystal holders and receiver tube types (8)FM2A05A | | |

# RADIO

RADIO

## RADIO EQUIPMENT—JAPANESE AIRCRAFT

| | JAPANESE SET DESIGNATION | | | |
|---|---|---|---|---|
| | Type 98 Ku 3 | Type 98 Ku 4 | Type 1 Ku 3 | Type 2 Ku 3 |
| **TECHNICAL DATA** | | | | |
| Frequency Range (Megacycles) | 30.0-50.0 | 29.5-52.5 | 30.0-45.0 | 0.3-20.0 |
| Transmitter Circuit | Crystal Oscillator | Crystal Oscillator | Crystal Oscillator | Crystal or S.E. Oscillator |
| Power Output | 3 Watts Phone | 12 Watts Phone | 5 Watts Phone | 60 Watts Phone<br>200 Watts C.W. |
| Transmitter Tuning | | 2 Controls<br>1 Switch | 2 Controls | 4 Controls |
| Type of Emission | MCW and Phone | MCW and Phone | CW and Phone | CW, MCW and Phone |
| Antenna | 3/4 Wave | Fixed Aircraft | Fixed Aircraft | Fixed Aircraft |
| Receiver Circuit | | Superheterodyne | Superheterodyne | Superheterodyne |
| Sensitivity | | | 4 Microvolts | 2 Microvolts |
| Selectivity | | | 8 KC @-6DB | 4 KC @ -6DB |
| Receiver Tuning | | 2 Controls<br>1 Switch | 1 Control | 5 Controls |
| Tubes Used | Trans.(4) ?<br>Rcvr. (7) ? | (3)UX807 (1)6K7<br>(1)6A8 (1)6J7<br>(1)6B8 (1)6V6<br>(1)6K8 | (4)6V6 (2)6K7<br>(2)6J7 | (1)FB325A<br>(1)FZ064A<br>(10)FM2A05A |
| Trans. and Rec. Size (Inches) | | 16 x 8 x 11 | 14 x 6 x 6 | 21 x 15 x 12 |
| Overall Weight (Lbs.) | 20 | 30 | 25 | 75<br>(complete) |
| Power Source | | 1 Dynamotor | 1 Vibrator | 1 Dynamotor |
| **TACTICAL DATA** | | | | |
| Use in Aircraft | Liaison | Liaison | Liaison | Liaison<br>Command |
| Range (Mi. & Alt. in ft.) | 20 @ 10,000 | 75 @ 10,000 | 50 @ 10,000 | |
| **REMARKS** | Documentary evidence only | Output frequency 8th harmonic of crystal | Tube Types vary with model | |

## RADIO EQUIPMENT—JAPANESE AIRCRAFT

| | JAPANESE SET DESIGNATION | | | |
|---|---|---|---|---|
| | Type 3 Ku 1 | Type 3 Ku 5 | Type 0 Ku 4 Direction Finding | Type 1 Ku 3 Direction Finding |
| **TECHNICAL DATA** | | | | |
| Frequency Range (Megacycles) | 5.0-10.0 | Trans. 2.5-20.0<br>Rcvr. 0.3-20.0 | 0.165-1.2 | 0.17-1.2 |
| Transmitter Circuit | Crystal or Self Excited | Crystal or Self Excited | | |
| Power Output | 75 Watts CW<br>25 Watts Phone | 75 Watts | | |
| Transmitter Tuning | 2 Controls | 4 Controls (each channel) | | |
| Type of Emission | CW, MCW and Phone | CW and Phone | | |
| Antenna | Fixed Aircraft | Fixed Aircraft (separate channels) | Loop | Loop |
| Receiver Circuit | Superheterodyne | Superheterodyne | Superheterodyne | Superheterodyne |
| Sensitivity | 0.8-3.8 Microvolts | 2 Microvolts | | |
| Selectivity | 20.8 KC @ -6DB | 4 KC @ -6DB | | |
| Receiver Tuning | 1 Control | 4 Controls | | 2 Remote Controls |
| Tubes Used | Trans. (1)FB325A (1)FZ064A<br>Rcvr. FM2A05A (10) | (4)FC064A (3)FB325A (10)FM2A05A | 6 Tubes ? | (1)6P7G (3)6V6 (3)6J7 (4)6K7 (1)6B8 (1)6L7 (1)6J5 (1)6Q7 |
| Trans. and Rec. Size (Inches) | 17 x 8 x 8 | Trans. 27 x 21 x 15<br>Rcvr. 15 x 12 x 12 | Size varies with model number | 18 x 9 x 6 |
| Overall Weight (Lbs.) | 70 (complete) | 150 (complete) | | 15 |
| Power Source | 2 Dynamotors | 1 Dynamotor (built in) | | 1 Dynamotor |
| **TACTICAL DATA** | | | | |
| Use in Aircraft | Command Liaison | Command | Direction Finding | Direction Finding |
| Range (Mi. & Alt. in ft.) | 100 @ 10,000 | 200 @ 10,000 | | |
| **REMARKS** | Excellent design, no moisture proofing | 3 Channel Set | | Identical with U.S. Fairchild Set |

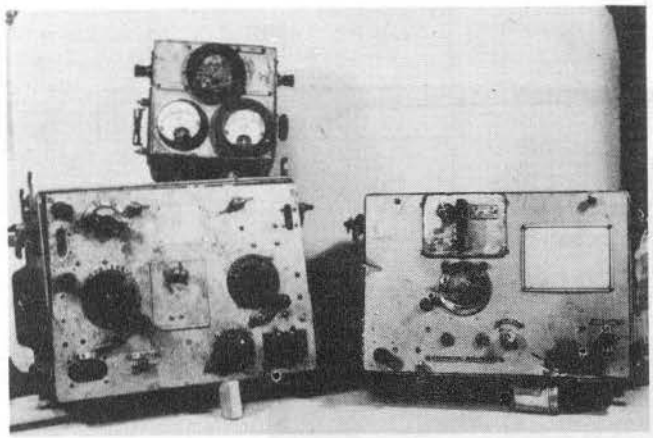
963

# RADIO

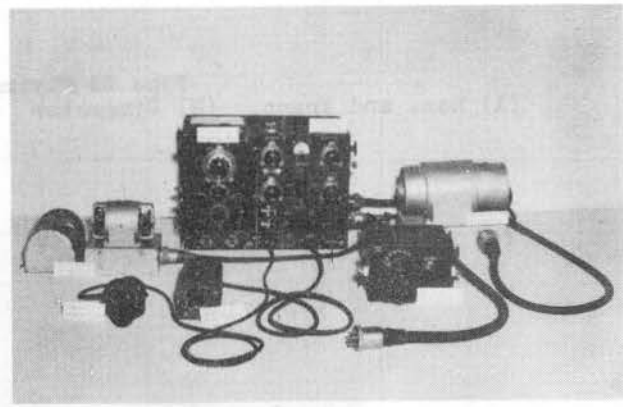
## RADIO EQUIPMENT—JAPANESE AIRCRAFT

| | JAPANESE SET DESIGNATION | | | |
|---|---|---|---|---|
| | | | | |
| **TECHNICAL DATA** | | | | |
| Frequency Range (Megacycles) | | | | |
| Transmitter Circuit | | | | |
| Power Output | | | | |
| Transmitter Tuning | | | | |
| Type of Emission | | | | |
| Antenna | | | | |
| Receiver Circuit | | | | |
| Sensitivity | | | | |
| Selectivity | | | | |
| Receiver Tuning | | | | |
| Tubes. Used | | | | |
| Trans. and Rec. Size (Inches) | | | | |
| Overall Weight (Lbs.) | | | | |
| Power Source | | | | |
| **TACTICAL DATA** | | | | |
| Use in Aircraft | | | | |
| Range (Mi. & Alt. in ft.) | | | | |
| **REMARKS** | | | | |

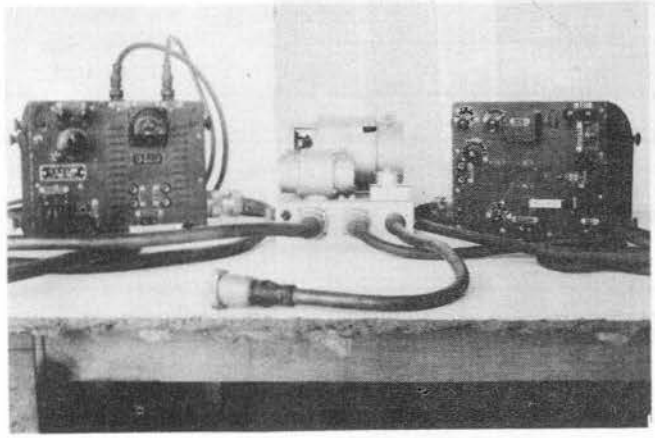
**PHOTOGRAPHS—JAPANESE AIRCRAFT RADIO EQUIPMENT**



Type 94 Flying Mark 2



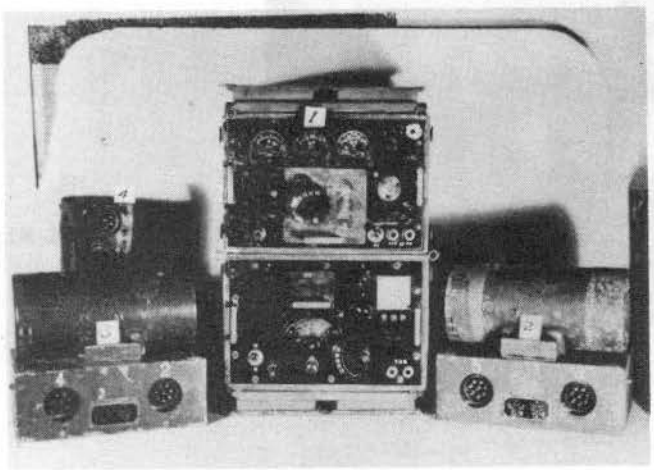
Type 96 Mark 2



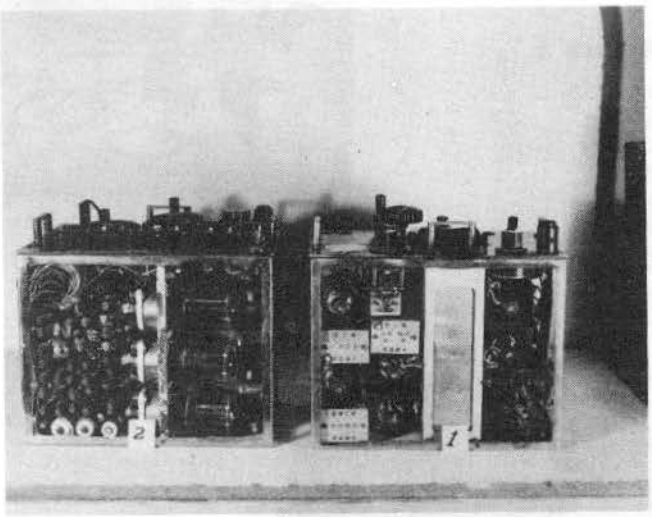
Type 96 Aero Mark 1

# RADIO

## PHOTOGRAPHS—JAPANESE AIRCRAFT RADIO EQUIPMENT



Type 99 Flying Mark 1
(1) Rec. and Trans. (2) Dynamotor (3) Dynamotor (4) Junction Box

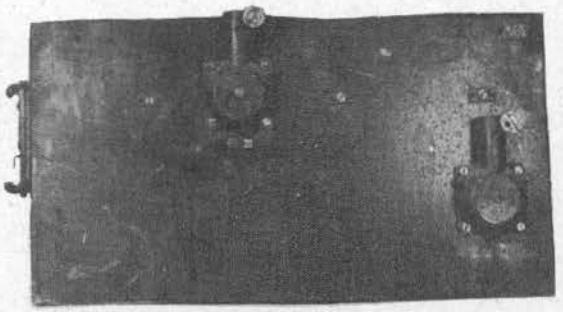


Type 99 Mark 1 (1) Receiver (2) Transmitter

## PHOTOGRAPHS—JAPANESE AIRCRAFT RADIO EQUIPMENT

RADIO DIRECTION FINDERS

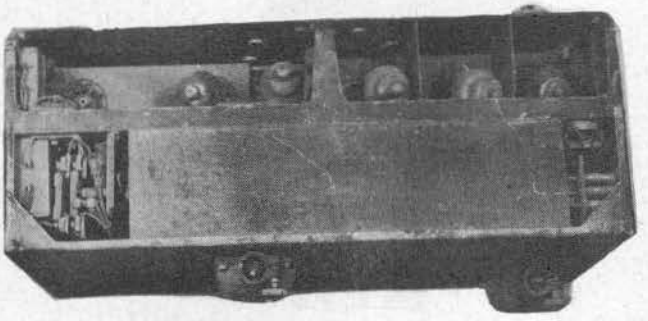
ARMY



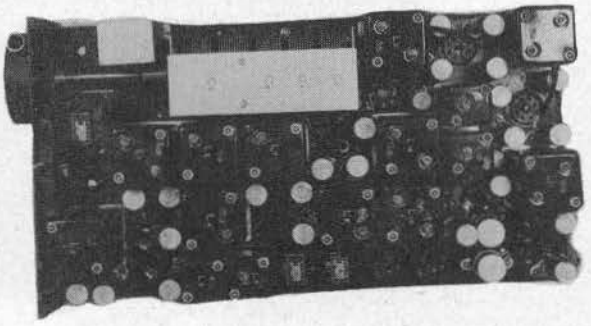
Front

Hi 1 Mod. 2

Top



NAVY



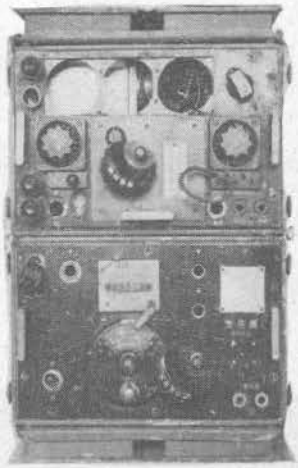
Type 1 Ku 3

# RADIO

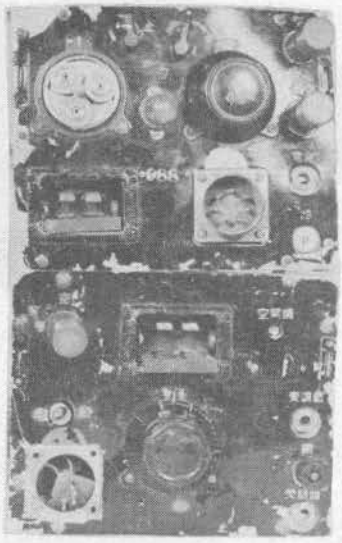
RADIO

## PHOTOGRAPHS—JAPANESE AIRCRAFT RADIO EQUIPMENT

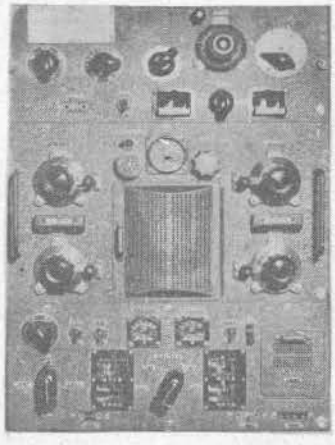
Type 99 Hi 1



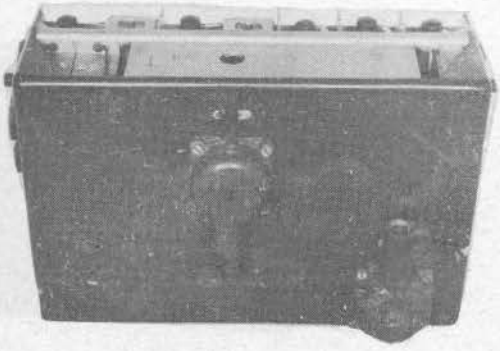
Type 4 Hi 3 Mod. 2



Type 2 Ku 3

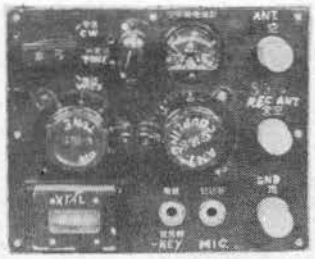


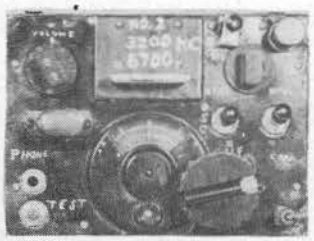
Hi 2 RDF



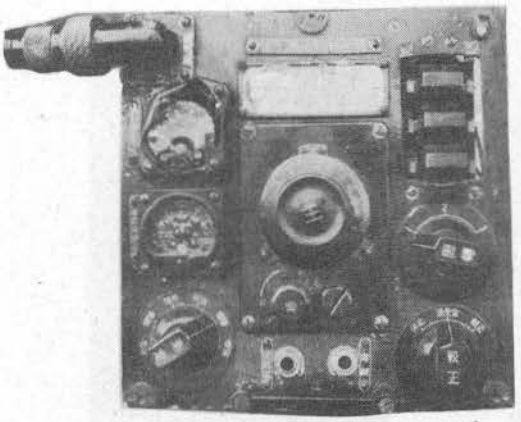
PHOTOGRAPHS—JAPANESE AIRCRAFT RADIO EQUIPMENT

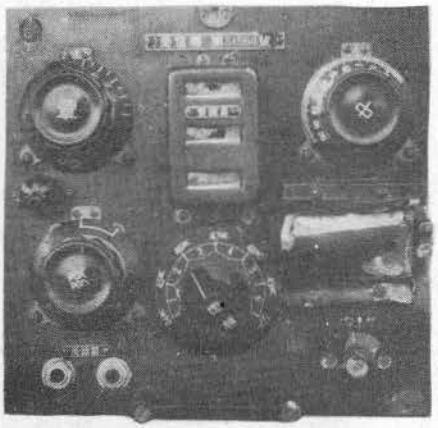
Type 99 Hi 3




Type 99 Hi 4



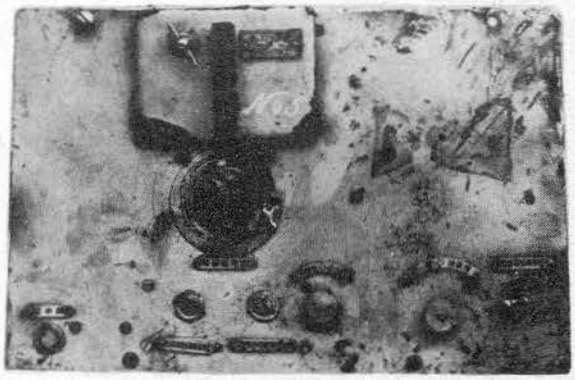


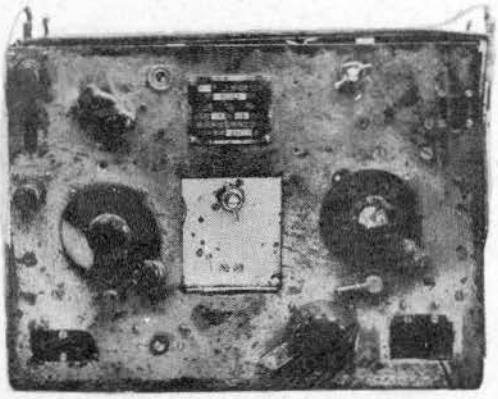
# RADIO

RADIO

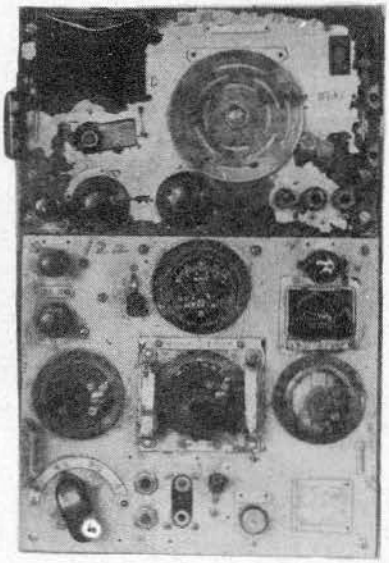
## PHOTOGRAPHS—JAPANESE AIRCRAFT RADIO EQUIPMENT

Type 94 Hi 2

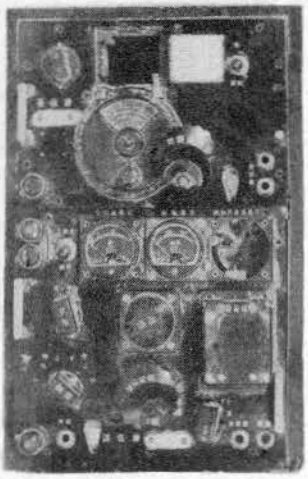




Type 96 Hi 2

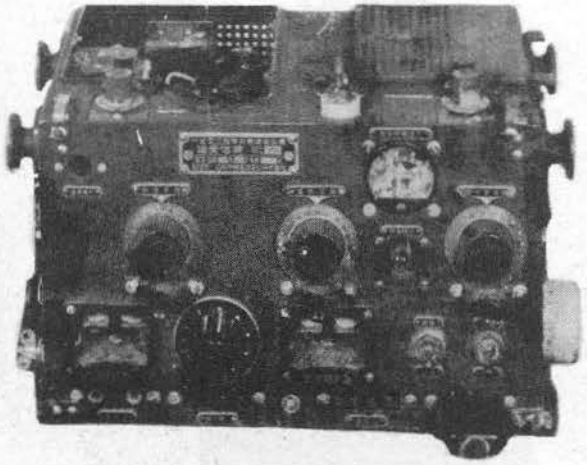


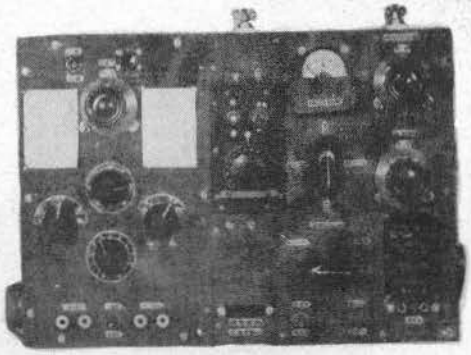
Type 99 Hi 2



PHOTOGRAPHS—JAPANESE AIRCRAFT RADIO EQUIPMENT

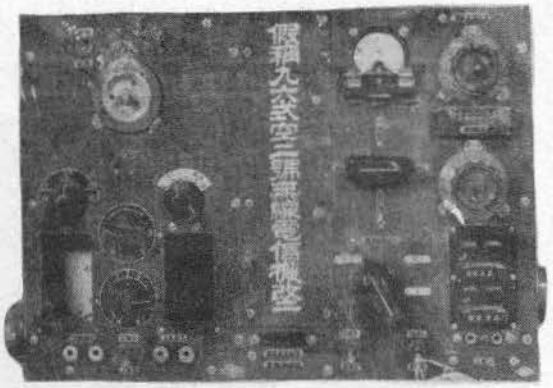
Type 1 Ku 3





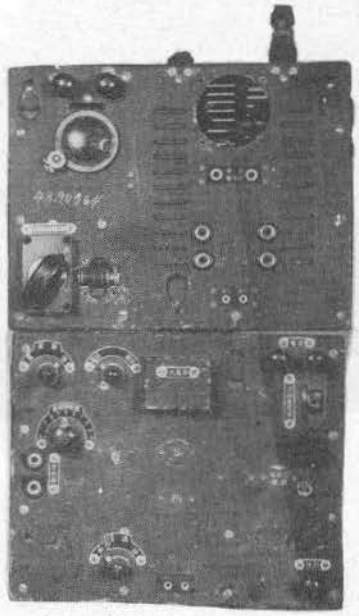
Type 96 Ku 2 Mod. 1

Type 96 Ku 2 Mod. 2

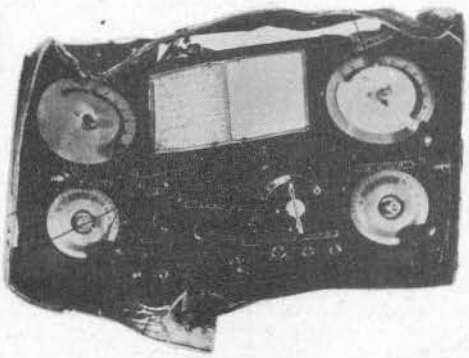


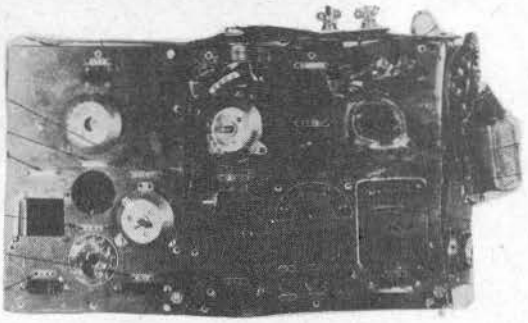
PHOTOGRAPHS—JAPANESE AIRCRAFT RADIO EQUIPMENT

Type 96 Ku 1

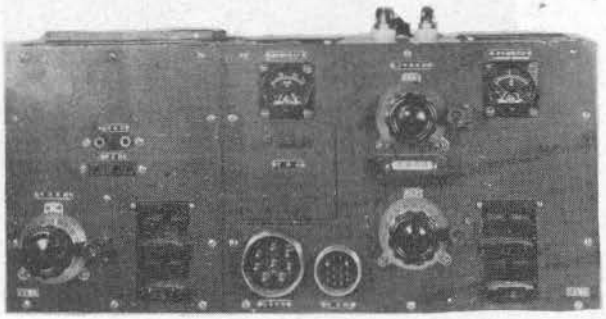


Type 96 Ku 3
(Receiver)





Type 98 Ku 4



Type 3 Ku 1

NOTES

# CONVERSION TABLE

(ALL FIGURES AVERAGE)

| TO CONVERT | INTO | MULTIPLY BY |
|---|---|---|
| Atmospheres | Lbs/In.$^2$ | 14.7 |
| C° | F° | (C°×9/5)+32 |
| Centimeters | Inches | 0.3937 |
| Cubic Centimeters | Cubic Inches | 0.0610 |
| Cubic Feet | Gallons (U. S.) | 7.51 |
| Cubic Feet | Gallons (Imp.) | 6.23 |
| Cubic Inches | Cubic Centimeters | 16.3872 |
| Cubic Inches | Liters | 0.0164 |
| Cubic Meters | Cubic Feet | 35.3144 |
| Cubic Meters | Cubic Yards | 1.3079 |
| Cubic Yards | Cubic Meters | 0.7646 |
| F° | C° | (F°−32)×5/9 |
| Fathoms | Feet | 6 |
| Feet | Fathoms | 0.1666 |
| Feet | Meters | 0.3048 |
| Feet/Minute | Miles/Hour | 0.01137 |
| Feet/Second | Miles/Hour | 0.6818 |
| Feet/Second | Meters/Minute | 18.288 |
| Gallons (Imp.) | Gallons (U. S.) | 1.205 |
| Gallons (U. S.) | Gallons (Imp.) | 0.8327 |
| Gallons (Imp.) | Cubic Feet | 0.1605 |
| Gallons (U. S.) | Cubic Feet | 0.1337 |
| Gallons (Imp.) | Liters | 4.543 |
| Gallons (U. S.) | Liters | 3.7853 |
| Gallons Gasoline (Imp.) | Lbs. | 7.25 |
| Gallons Gasoline (U. S.) | Lbs. | 6.13 |
| Gallons Oil (Imp.) | Lbs. | 9.4 |
| Gallons Oil (U. S.) | Lbs. | 7.5 |
| Gallons Water (Imp.) | Lbs. | 10.00 |
| Gallons Water (U. S.) | Lbs. | 8.3 |
| Grains | Grams | 0.0648 |
| Grams | Grains | 15.4324 |
| Grams | Ounces (Avoirdupois) | 0.0352 |
| HP (Metric) | HP (U. S.) | 0.9863 |
| HP (U. S.) | HP (Metric) | 1.014 |
| Inches | Centimeters | 2.5399 |
| Inches | Feet | 0.0833 |
| Inches | Meters | 0.0254 |
| Inches | Millimeters | 25.4001 |
| Inches | Yards | 0.0277 |
| Kg/Cm $^2$ | Lbs/In.$^2$ | 14.22 |
| Kg/Meter $^2$ | Lbs/Ft.$^2$ | 0.2048 |
| Kg/Metric HP | Lbs/Brake HP (Engl.) | 2.236 |
| Kilograms (1000 gms.) | Lbs. (Avoirdupois) | 2.2046 |
| Kilograms | Ounces (Avoirdupois) | 35.2739 |
| Kilometers | Statute Miles | 0.6213 |
| Kilometers | Nautical Miles | 0.5395 |
| Km/Liter | Miles/Gallon (U. S.) | 2.35 |
| Lb. (7000 gms.) | Kilograms | 0.4536 |
| Lbs/In.$^2$ | Kgs/Cm $^2$ | 0.0703 |
| Lbs/Ft.$^2$ | Kgs/Meters $^2$ | 23.83 |
| Lbs/In.$^3$ | Atmospheres | 0.068 |
| Lbs/B. H. P. (Engl.) | Kg/HP (Metric) | 0.447 |
| Liters | Cubic Inches | 61.025 |
| Liters | Gallons (Imp.) | 0.220 |
| Liters | Gallons (U. S.) | 0.264 |
| Liters | Pints (Imp.) | 1.76 |
| Liters | Pints (U. S.) | 2.1134 |
| Long Tons | Lbs. | 2240. |
| Meters | Feet | 3.2808 |
| Meters | Inches | 39.37 |
| Meters | Yards | 1.0936 |
| Meters/Minute | Feet/Second | 0.0547 |
| Meters/Second | Miles/Hour | 2.237 |
| Miles | Kilometers | 1.6093 |
| Miles/Gallon (U. S.) | Km/Liter | 0.428 |
| Miles/Hour | Feet/Minute | 88. |
| Miles/Hour | Feet/Second | 1.467 |
| Miles/Hour | Knots | 0.8684 |
| Miles/Hour | Meters/Second | 0.447 |
| Millimeters | Inches | 0.0393 |
| Nautical Miles | Kilometers | 1.8516 |
| Nautical Miles | Statute Miles | 1.1516 |
| Ounces (Avoirdupois) | Grams | 28.349 |
| Ounces (Avoirdupois) | Kilograms | 0.0283 |
| Pints (Imp.) | Liters | 0.568 |
| Pints (U. S.) | Liters | 0.4732 |
| Ship Tons | Cubic Feet | 40. |
| Short Tons | Lbs. | 2000. |
| Square Centimeters | Square Inches | 0.155 |
| Square Feet | Square Meters | 0.0929 |
| Square Inches | Square Centimeters | 6.4516 |
| Square Km. | Square Miles | 0.3861 |
| Square Meters | Square Feet | 10.764 |
| Square Meters | Square Yards | 1.1960 |
| Square Miles | Square Kilometers | 2.590 |
| Square Yards | Square Meters | 0.8361 |
| Statute Miles | Nautical Miles | 0.8684 |
| Yards | Meters | 0.914 |

1 English Atmosphere — 14.7 Lbs/In.$^2$ — 29.92" Hg — 1.033 Kg/Cm $^2$
1 Metric Atmosphere — 14.2 Lbs/In.$^2$ — 28.87" Hg — 1.000 Kg/Cm $^2$
Sea Level Pressure — 14.7 Lbs/In.$^2$

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